Commentary

September 1996

The War of the Schools

Chester E. Finn, Jr.
Wilfred M. McClay

Defenseless America

Angelo M. Codevilla

Beyond King James

Robert Alter

Splitting Up

Joseph Adelson

The Art Biz—A Story

Allegra Goodman

(Over)praising Duke Ellington

Terry Teachout

A SPECIAL SECTION

Denying Darwin

David Berlinski and Critics

Books in Review

Christopher Caldwell • Gary Saul Morson • Elizabeth Kristol
Bret Stephens • Joshua Muravchik

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Commentary
September 1996

CONTROVERSY

Denying Darwin

David Berlinski and Critics

H. ALLEN ORR:

Having thoroughly enjoyed David Berlinski's recent book, *A Tour of the Calculus*, I am not eager to squabble publicly with him. But I am afraid I must. In his article, "The Deniable Darwin" [June], Mr. Berlinski discusses an essay of mine in which I criticize an extremist style of evolutionary thinking called "adaptationism." He concludes: "Like Orr, many biologists see an acknowledgment of their doubts as a cagey, a *calculated*, concession; but cagey or not, it is a concession devastating to the larger project of Darwinian biology."

I admit I briefly enjoyed the suggestion that my essay is so clever that it manages to undermine Darwinism. But, alas, Mr. Berlinski is exaggerating just a tad. The claim that my criticism of adaptationism, or, . . . for that matter, any other biologist's criticism of any other "ism," has pulled the rug out from under Darwin is just wrong.

But Mr. Berlinski has his own, fairly novel, criticisms of Darwinism. A couple of these are very clever and, to a nonbiologist, surely seductive. I am writing, therefore, to explain why I think these criticisms are wrong.

But first a few facts. Near the beginning of his essay, Mr. Berlinski states: "Evolution is a process, one stretching over four billion years. It has not been observed." While it is true that no biologist attended the last four billion years of evolution, the claim that evolution has not been observed is simply wrong. Examples are a dime a dozen. When antibiotics were first introduced, most bacteria were susceptible. Antibiotics were handed out like candy and anyone who had read a page of Darwin could have predicted the result: now, many bacteria are resistant. And Mr. Berlinski surely knows what happened when we threw DDT at insects: they evolved insecticide resistance. On a grander scale, botanists have documented the recent evolution of new species and some species have even been recreated from their ancestors in the lab. Though hardly packing the drama of reptiles metamorphosing into mammals (but what do you expect in 100 years of observation?), these are all ironclad—and witnessed—examples of evolution.

But on to Mr. Berlinski's more novel criticisms of Darwinism. He has two worries. First, can random changes in an "alphabetic" system (like DNA) fuel evolution? And second, if evolution is fueled by such changes, how does it know "where to go"?

Mr. Berlinski's first question is more sophisticated than it might seem. He is not just rehashing the tired argument that Darwinism depends on random mutations and that such changes cannot build something as fancy as an eye. He knows that Darwinism is not just "random mutations" but "random mutations *plus* natural selection," which is a different beast altogether. His worry is more subtle. It is this: DNA is "alphabetic," a discrete language of A's, T's, G's, and C's that somehow encodes all the designs we find in organisms. But how can random perturbations in such a language yield usable material for evolution? In every other language we know of, Mr. Berlinski writes, "randomness . . . is the enemy of order." Random changes in English yield gibberish. Random changes in computer programs are even worse: we cannot even ask what a "modified program would compute; it just jams." And so, he argues, look what Darwinism really asks of us: it demands we believe that selection

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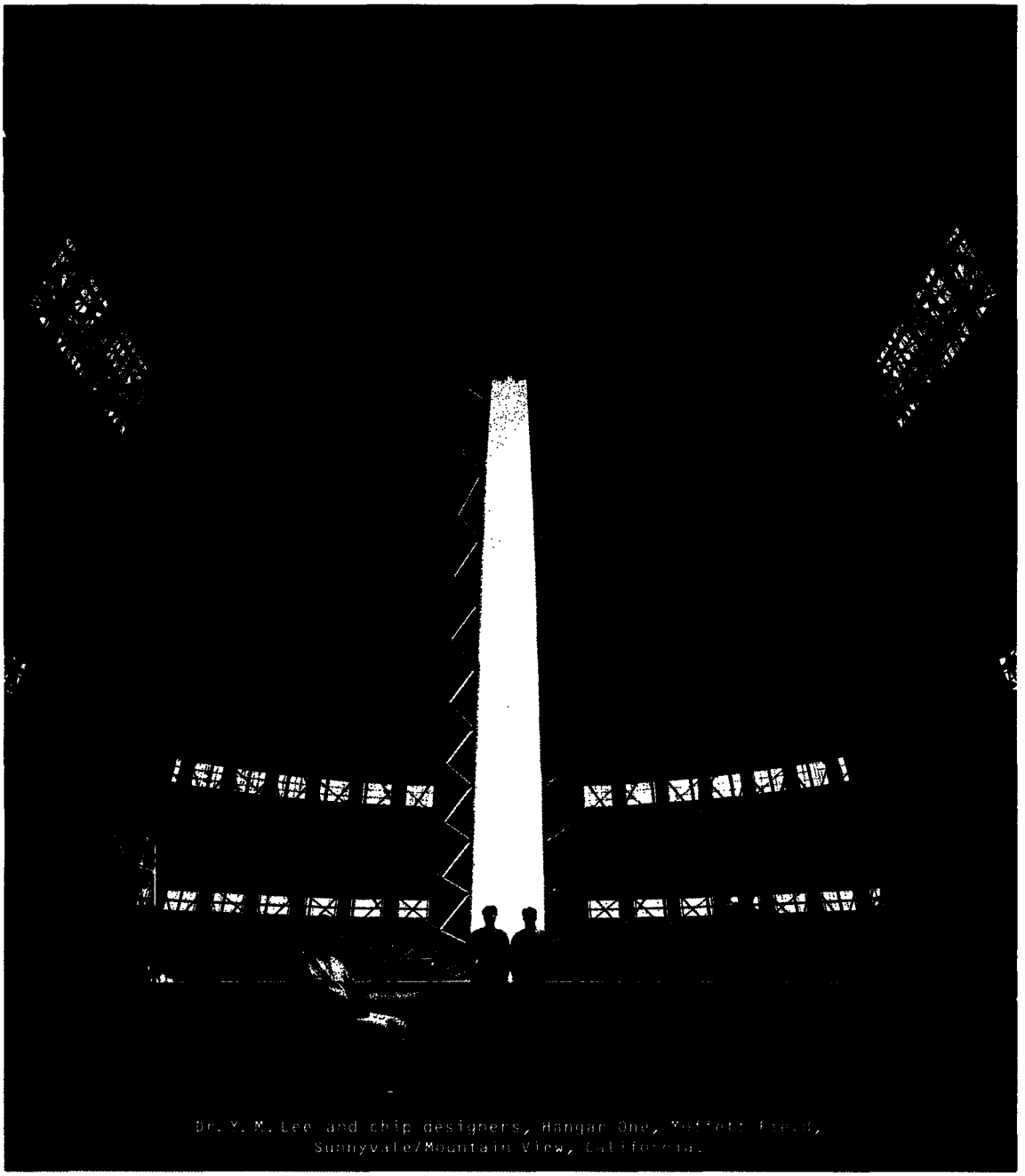

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uses random changes in DNA, when—by analogy with any other formal language—such changes should yield mere gibberish, hopelessly "jamming" organisms.

Mr. Berlinski's objection is one of those beautiful theories that gets killed by an ugly fact. The fact is: whether or not random DNA changes *should* invariably jam organisms, they do not. While lethal mutations—changes which so derail an organism that it dies—are common, so are mutations of such benign and subtle effect that heroic chemical measures are required just to find them. The existence of subtle, functional, *usable* mutations in DNA is a simple fact that no amount of analogizing with computer programs can make go away. That random changes in computer programs—but not DNA—invariably jam things does not show that there is something wrong with Darwinism but that there is something wrong with the analogy.

What about Mr. Berlinski's second criticism? Even if random mutation could provide usable material for evolution, how does evolution know where to go? Mr. Berlinski retells the story of the proverbial monkeys who—banging away at their typewriters—try to create a phrase from Shakespeare. In Mr. Berlinski's version, a "Head Monkey" preserves any stray letter that matches the target phrase. For the evolutionist who usually tells the story, the point is that it does not take long for this cumulative sifting process to yield the desired phrase: mutation (typing) plus selection (save the matches) works. But Mr. Berlinski is not sold: "A *target* phrase? Iterations that *most* resemble the target? A Head Monkey that *measures* the distance between success and failure? If things are sightless, how is the target represented?" The Designer, allegedly tossed out of a job by Darwinism, has apparently reappeared as the guy who erects the target and measures the distance between here and there.

Mr. Berlinski certainly shows that the monkey analogy is imperfect. But that is true of any analogy . . . and the monkey analogy captures an important part of Darwinism. It shows that, by saving favorable random changes, evolution can gradually build fancy structures. One need not wait for all the "parts" to appear miraculously at once.

But the analogy completely flubs another part of Darwinism: evolution does not, of course, work toward any "target." So how, then, does evolution know where to go? The answer is the most radical and beautiful part of Darwinism: it does not. The only thing that "guides" evolution is sheer, cold demographics. If a worm with a patch of light-sensitive tissue leaves a few more kids than a worm that cannot tell if the lights are on, that is where evolution will go. And, later, if a worm with light-sensitive tissue and a rough lens escapes a few more predators, that is where evolution will go. Despite all the loose talk (much of it, admittedly, from evolutionary biologists), evolution knows nothing of "design" and "targets." . . .

In the end, I am afraid that Mr. Berlinski's criticisms do not fare any better than those of other anti-evolutionists. I will be the first to admit, though, that Mr. Berlinski is not a traditional anti-evolutionist. I know him well enough to know that he, unlike them, is neither anti-scientific nor doctrinaire. His criticisms—like those from any good scientist—are, I think, both sincere *and* tentative.

Department of Biology
University of Rochester
Rochester, New York

RICHARD DAWKINS:

David Berlinski's article reminds me of the tactics employed by a certain creationist with whom I once shared a platform in Oxford. The great evolutionist John Maynard Smith was also on the bill, and he spoke after this creationist. Maynard Smith was, of course, easily able to destroy the creationist's case, and in his good-natured way he soon had the audience roaring with appreciative laughter at its expense. The creationist had his own peculiar way of dealing with this. He sprang to his feet, palms facing the audience in a gesture eloquent of magnanimous reproof. "No, no!" he cried reproachfully, "Don't laugh. Let Maynard Smith have his say. It's only fair!" This desperate pretense that the audience was laughing at Maynard Smith, when in fact it was laughing *with* Maynard Smith at the creationist himself, reminds me of Mr. Berlinski's pretending to misunderstand Jacques Monod and me to the extent of thinking we disagree with each other over the issue of chance.

As for the identity of the creationist who tried to pull this little stunt on Maynard Smith, it was none other than David Berlinski. The audience, by the way, saw through his tactic instantly and treated it with hoots of derision.

University Museum
Oxford University
Oxford, England

DANIEL C. DENNETT:

I love it: another hilarious demonstration that you can publish bull---t at will—just so long as you say what an editorial board wants to hear in a style it favors. First there was Alan Sokal's delicious unmasking of the editors of *Social Text*, who fell for his fashionably anti-scientific "proof" that according to quantum physics, the world is a social construction. Now David Berlinski has done the same to the editors of COMMENTARY, who fell just as hard for his parody of "scientific" creationism. They must really be oppressed by evolutionary theory to publish such inspired silliness without running it by a biologist or two for soundness. Two such similar pranks in a single month make one wonder if this is just the tip of the *Zeitgeist*. What next? A hoax extolling the educational virtues of machine guns for tots in the *American Rifleman*?

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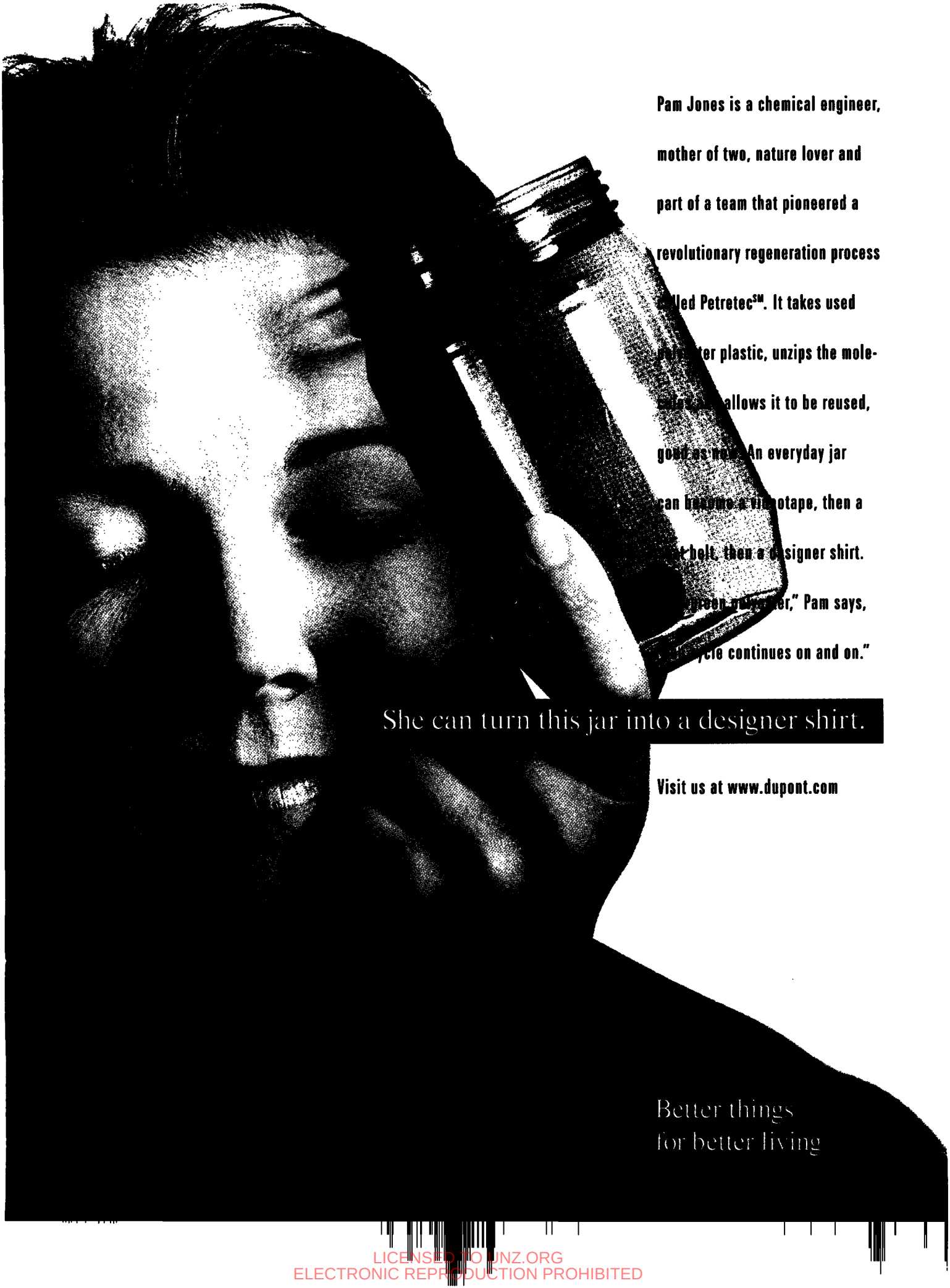

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I love the rich comic patina of smug miseducation Mr. Berlinski exudes: Latin names for species mixed with elementary falsehoods in about equal measure, the subtle misuse of "*Doppelgänger*," the "unwitting" creation of a new term, "combinatorial inflation," and the deft touch of "betraying" his cluelessness by referring to Kim Sterelny as "she."

The hints are subtle but conclusive. No serious opponent of evolutionary theory would trot out the ill-considered remarks of the mathematician M.P. Schützenberger—a line of discredited criticism quietly abandoned by others years ago—without so much as a hint about their standing. How could the heroic misunderstanding of Jacques Monod that enables our author to pit Monod against Richard Dawkins be anything but disingenuous? Could any actual professor of mathematics and philosophy "in American and French universities" misrepresent the import of the second law of thermodynamics with such poetic fervor, such blithe overconfidence?

Whoever this David Berlinski is, he is clever enough to fool COMMENTARY, and I wouldn't even be surprised if some evolutionists take him seriously enough to rebut him in detail. Even better, some earnest creationists may clasp him to their bosom. That is, one presumes, his larger joke. The only reason I am exposing it now (killjoy that I am) is to make it clear that so far as I know, we evolutionists did not put him up to it. We feel no need to burden our critics with such *agents provocateurs*, but they are welcome to him if they want him.

Center for Cognitive Studies
Tufts University
Medford, Massachusetts

ARTHUR M. SHAPIRO:

. . . When I debate anti-evolutionists, I always warn the audience that a critic can raise more issues in a given amount of time than a defender can answer. The defender is thus vulnerable to the claim that he has failed to address this or that criticism. In replying to David Berlinski's eloquent but deeply flawed article, let me stress that I am not concerned with a point-by-point refutation. I am much more interested in his uses of rhetoric to create unjustified impressions in the mind of the reader. . . .

Most biologists I know are driven by curiosity, not ideology. We recognize that it is pointless to deny that a real world exists, and dangerous to place perfect faith in our own objectivity in interpreting it. That is why science has institutionalized skepticism in the process of criticism and competition. . . . We are indeed human in becoming enamored of or trapped in our own ideas, but we are surrounded by hungry rivals who work to keep us honest.

That is just as true in evolutionary biology as in other sciences. So how can Mr. Berlinski get away with accusing us of hushing up our disagreements in order to present a united front against our cultural foes? There is no more contentious, pugnacious, querulous bunch of professionals on earth than evolutionary biologists, . . . and intergenerational and ideological conflicts within academia keep the pot boiling in a very public way. In the process, anti-evolutionists are provided with a mountain of very quotable quotes, usually presented to the public out of context. If we were so concerned with papering over our differences, why would we debate them before the public? . . .

I was at the Wistar Institute in 1966 when Murray Eden and M.P. Schützenberger presented their arguments, cited approvingly by Mr. Berlinski. If he had read the proceedings of that meeting, he would know that it was organized at the instance of the biologists, who wanted the opportunity to hear and discuss the criticisms of their mathematical colleagues. He would also know that some of the objections he cites now were actually dealt with effectively from the floor. Instead, he disingenuously implies that those arguments still bear as much force now as they did then—that they somehow have been swept under the rug or ignored by biologists.

Mr. Berlinski ignores the fact that mathematics has been the indispensable handmaiden of evolutionary biology for over 70 years. Does he really think nothing interesting has happened in evolutionary biology for 30 years, or that anything interesting that has happened has merely weakened the Darwinian paradigm? Perhaps. After all, with the avalanche of technical, semipopular, and popular books on paleobiology published in recent years, Mr. Berlinski sends his readers off to consult Alfred S. Romer's classic treatise on vertebrate paleontology, also published in 1966, and showing its age badly.

In another display of disingenuousness, Mr. Berlinski wants evolutionary biologists to explain from first principles why one species of widow spider commits sexual suicide while another does not. He knows perfectly well that the chain of causes is too long, with too many opportunities for historical contingency to operate, for anyone with less than the omniscience of the deity to do that. But just as physics rules out mountains shaped like inverted cones, so, too, does Darwinism rule out certain things. For example, it rules out any organism displaying a structure or behavior that enhances the fitness of some other species while reducing its own: the cartoonist Al Capp's altruistic "Shmoos" were a Darwinian impossibility. That is precisely why "altruism" was such a hot topic among evolutionists in the 1960's and 70's, when numerous biologists tried and failed to demonstrate its existence in nonhuman species.

One final point, which, while seemingly a trivial matter of semantics, illuminates the deepest problem of Mr. Berlinski's essay: our ability to reconstruct the history of life (phylogeny) depends

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upon the "tree of life" not only *not* being "densely reticulated," but *not reticulated at all.* "Reticulated" means net-like; branches diverge, then anastomose. But in phylogeny, branches, once separate, stay separate. It is this fact that enables us to reconstruct phylogeny through the method of nested, shared resemblances, now usually called "cladistics." That method fails if branches really do anastomose—either through hybridization, which is rare in many groups but frequent in others, or through a more arcane process such as the vectoring of genetic information across taxonomic lines by viruses.

If the tree of life were very reticulate, formal phylogenetic reconstruction would be impossible, and we truly would have a problem—not with the Darwinian paradigm *per se*, but with our ability to know whether it was true or false.

Mr. Berlinski could write a good essay about a living, breathing issue like that—were he not so preoccupied with rehashing the debates of 30 years ago. . . .

Division of Biological Sciences
Section of Evolution and Ecology
University of California
Davis, California

PAUL R. GROSS:

Berlinski No. 1 ["The Soul of Man Under Physics," January] was amusing: especially his silly similes, such as Jupiter's moons in the guise of testicles. Most of the science was OK, although marred by glosses that were themselves errors. . . .

Berlinski No. 2 is much more presumptuous and more seriously wrong. How could COMMENTARY not have let *some* biologist or other read it? I do not have the space to deal with all his unsupported or dead-wrong assertions, so I will just make a few counterassertions which perhaps will reduce the encouragement Mr. Berlinski has given creationists and other consumers of anti-science who might be among COMMENTARY's readers.

The claim that intermediate fossil forms are absent is simply false. It is the oldest canard in the creationist handbook. Picking and choosing from among a few of the more florid statements of Stephen Jay Gould and Niles Eldredge does not reveal to the innocent reader . . . why these two are and have always been convinced of the essential truth of organic evolution as Darwin first described it and of natural selection as at least one mechanism of it.

The "fitness" argument is dealt with, seriously, in every introductory course in biology, including the ones I have taught. Mr. Berlinski's fixation on it was out of date a very long time ago.

"What good is 5 percent of an eye?," is a stupid question if asked in the context in which Mr. Berlinski places it. Moreover, there is new and astonishing evidence of the genetic, hence selective, mechanism underlying the embryology of *all* eyes—insects, mice, humans.

Mr. Berlinski grossly misrepresents Jacques Monod's argument, as he does the way in which "chance" is used and understood in modern biology. It is possible he really does not know, but I am not sure; maybe he is a postmodernist at heart.

"*Bauplan*," like a few other fancy words, is comically misused.

I could go on and on, . . . but for a small fee I would be glad to support all these assertions with citations of solid science from the *current* literature of molecular and evolutionary biology. A bit of that literature Mr. Berlinski may have mined; but if so, he has done it the same way that "Intelligent Design Theorists" mine it: to extract a few sentences here and there for the comfort of creationists. This second Berlinski opus amounts to a charge that biologists are in a conspiracy to

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hide from outsiders the bankruptcy of the central principle of biology. . . .

As I did once before, I deplore COMMENTARY's giving such comfort to Luddites.

Center for Cell Signaling
University of Virginia
Charlottesville, Virginia

RANDY M. WADKINS:

. . . It would take an article longer than David Berlinski's original one just to correct and/or clarify his many misstatements, and I will address only a few of them here. I would strongly suggest that anyone who thinks the points made by Mr. Berlinski seriously detract from evolutionary theory should read the *talk.origins* FAQ's (http://earth.ics.uci.edu:8080/origins/faqs.html) for a brief synopsis of why virtually everything he says on the matter of evolution is suspect. . . .

Mr. Berlinski states that "before the Cambrian era . . . very little is inscribed in the fossil record." Yet the oldest known fossils are of bacteria and stromatolites (containing blue-green algae), both of which are with us today, and are still among the simplest forms of life known. The Cambrian explosion occurred much later, after simple life (and even simple multicellular life) had already appeared. This is one of the many points in the fossil record that support evolution.

Mr. Berlinski fails to mention the specific cases where transitional fossil forms are found in abundance, and demonstrate quite readily how animals we know today have, without doubt, evolved from earlier forms. The exhibit on horse evolution at the Smithsonian Natural History Museum is quite convincing, and the evolution of horses is perhaps the most well-documented of any animal. . . .

Although he points out that gradualism is not considered to be an accurate description of evolution, Mr. Berlinski uses it anyway to argue against evolution. He presents several examples of related species which exhibit traits that, according to him, could not have come about if one came from the other (or from a precursor). But he neglects to point out that a *single* amino-acid mutation in a *single* protein is enough to cause amazing changes in a developing animal, such as eyes that grow on an insects' legs, or chickens that develop webbed duck feet and hair. . . .

Mr. Berlinski further asserts that evolution is random. It is not quite that simple. Evolution is accomplished by random mutations of DNA. However, the process of natural selection is not random at all. Any physician treating a relapsed cancer patient knows full well that the cancer . . . will be resistant to the original drugs used as therapy (and this resistance may be due to the overexpression of a single protein). This is not random in any sense. Similarly, any physician treating a patient infected with the new strains of antibiotic-resistant bacteria can tell you that there is nothing random about the selection of these bacteria: they grow where their predecessors could not.

More generally, when a red, orange, yellow, green, blue, and purple ball are all placed in a bag, there is a one-in-six chance that I will draw out the green one. If, however, I look into the bag, there is a 100-percent chance I will draw the green one. There is nothing random about this, and it is this nonrandom process (natural selection) that drives evolution. Mr. Berlinski does not see this at all. . . .

Just to show how ineffective Mr. Berlinski's "Advent of the Head Monkey" section is, . . . while Richard Dawkins was unable to write a computer program that simulates evolution, scientists more adept at programming have indeed been able to do just that. The natural-selection algorithm in Keen and Spain's *Computer Simulations in Biology* generates the phrase BASIC BIOLOGICAL MODELING IS FUN from a string of random letters, based on Dawkins's suggestions. Furthermore, the entire burgeoning field of genetic algorithms is based on similar, but more complex, models of evolution. . . .

The theory of evolution deserves constant criticism, as do all scientific theories. But . . . it deserves some challenges that are less trivial than the ones Mr. Berlinski proposes. . . .

Silver Spring, Maryland

KARL F. WESSEL:

The heart of David Berlinski's argument has been experimentally refuted, a result that is of more recent vintage than the obsolete mathematical metaphor he employs. In a 1986 experiment performed by Marshall Horwitz and Lawrence Loeb of the University of Washington, 19- base long messenger RNA promoter sequences were deleted from the genomes of *E. coli* bacteria and replaced by randomly synthesized sequences. Of the approximately 10^{11} possible sequences of the type, it turned out that many promoted the function of the deleted natural sequence (which confers resistance to tetracycline) as well as or better than the original. This was true even for a small subset of sequences randomly generated from two bases, i.e., from far fewer than 10^6 of the 10^{11}. Nor did some of the most efficient sequences at all resemble the original.

Given this outcome and others like it, it is clear that something is radically wrong with Mr. Berlinski's analogy of biological genomes to computer programs. Either genomes are nothing like programs, or else at least some programs are far more robust in the face of effects resembling natural selection than he imagines.

In point of fact, for several years people like John Koza of Stanford University have been using analogs of natural selection to evolve computer programs. Many of these evolved programs perform their optimizing tasks better than the best intentionally designed ones, providing the *reductio ad absurdum* of Mr. Berlinski's criticism. . . .

Mr. Berlinski seems to have been

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misled in his opinions by the unbiological prejudices of mathematicians accustomed to working with formal systems. Koza has addressed several of these biases in print. One of the most characteristic is the belief that the genome must be parsimonious, like the shortest proof of a mathematical theorem or the code of a highly compressed computer program. Maximally compressed programs, in the sense of algorithmic information theory, are necessarily both rare and randomly distributed within the space of all possible programs; in fact, such programs cannot be obtained through evolutionary processes, since genetic distances do not correlate nonrandomly with differences in fitness in this kind of regime. . . .

The fact is that biological genomes are not highly compressed in the information-theoretic sense but are, rather, extravagantly redundant, something that was not appreciated in the era (the 1960's) from which Mr. Berlinski draws his argument. Redundancies in the code help enhance evolvability by reducing the impact of deleterious mutations. At the same time, sexual recombination works to filter out deleterious mutations in the homozygote while helping fixate beneficial ones. . . .

When Mr. Berlinski's anti-Darwinian rhetoric is deflated, essentially nothing of his argument is left. Natural selection is neither more nor less "forcelike" than the Pauli Exclusion Principle; in both cases, probability distributions mimic the effects of forces. Gould and Dawkins are no more argumentative than Mach and Boltzmann, Einstein and Bohr, Glashow and the superstringers. States of punctuated equilibria fall out gracefully from highly plausible computer models of natural selection. William Paley's (and David Berlinski's) intuitions about the Design of the World are neither more nor less reliable than those of flat-earthers, goat-entrail readers, or believers in the Oedipus complex. . . . Incidentally, DNA was not discovered by James Watson and Francis Crick but by Friedrich Miescher (1869).

Rancho Palos Verdes, California

PHILIP H. SMITH, JR.:

In his elegant, lyrical critique of Darwinism, David Berlinski shrewdly derides the smugness of some mainstream evolutionists who consider the Darwinian theory of evolution "fact," . . . but the theory is far more robust than his attacks suggest.

Darwinism is a theory not unlike the Indo-European theory in linguistics, which holds that most of the languages of Europe and the Near East descended from a common parent language by a process of evolution. Each theory notices a number of facts—some contemporary, some fossil—and attempts to link them logically. Neither pretends to predict the future, either among biological organisms or among European languages.

In comparing Darwinism unfavorably with the science of geology, Mr. Berlinski indicates that he expects predictive natural laws from evolutionary theory, similar to the laws of physics. But Darwinism is much more a theory of history . . . than a predictive theory. In this it resembles the Indo-European theory. Although that theory talks in terms of sound-change "laws," these laws are really only observed historical regularities, and claim no predictive power.

Mr. Berlinski says that Darwinism "suggests a view in which living creatures are spread out smoothly over the great manifold of biological possibilities, like colors merging imperceptibly in a color chart," but he finds life in fact to be quite different. Evolution must, of course, proceed by myriad small changes, but not all the resulting life forms will be visible at one time. Indeed, as these numerous small changes occur, the less successful forms will, of necessity, no longer prevail, leaving the field to the latest-evolved forms. It would be unrealistic to expect a continuous rainbow of *all* life forms. In exactly analogous fashion, the linguistic landscape of Europe shows sharp discontinuities between the Romance and the Germanic areas, between Germanic and Slavic, and so on. . . .

Like many another critic of Darwinism, Mr. Berlinski applies the second law of thermodynamics to evolution. He suggests that life "appears to offer at least a temporary rebuke to the second law of thermodynamics." Not so. He has forgotten the phrase "in a closed system," which belongs in the statement of the second law. Life is not a closed system; it draws energy from the increasingly entropic universe to enhance its own order, no less than we do when we forge iron and other materials to make a highly organized automobile (or a watch). . . .

Both Darwinism and the Indo-European theory have been around for well over 100 years, and each has constructed an interlocked edifice of observed fact (plant, bone, rock; language, document inscription) and consistent explanations of their relationships, and in both cases the theories hang together pretty well. . . . Each waits to be torn down by a more satisfactory theory. This I fear Mr. Berlinski has not managed to do in his article, despite the eloquence of his prose.

Chapel Hill, North Carolina

SHELDON F. GOTTLIEB:

. . . David Berlinski fails to understand the role of determinism in evolution, not in the sense of an Intelligent Designer but in the inherent properties of molecules themselves. Sidney Fox and his colleagues have demonstrated that amino acids, when heated (to speed up the rate of the reaction) at temperatures found on Earth give rise to "thermal proteins" (TP's). When placed in water, TP's organize themselves into protocells. Protocells demonstrate the major properties associated with living organisms, including metabolism, electrical

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excitation, reproduction, and so forth. . . .

Fox's work shows that very early stages of evolution can occur rapidly, within minutes, and are highly reproducible. Sites where such reactions can and probably did occur include the hydrothermal vents found on the surface of the Earth and in the oceans. Around the ocean vents, highly complex ecosystems evolved. . . .

Like other creationists, Mr. Berlinski seems to refuse to accept the fact that the introduction of the supernatural removes the discussion from the realm of science. . . . In the world of the supernatural, anything goes, and the only limitation is the extent of one's imagination. No evidence is required to substantiate any claims. . . .

In science it is rarely appropriate to ask why. Scientists ask questions such as: what is the nature of _____?, or what is the mechanism whereby _____? Such questions take science out of the realm of the supernatural into the material world and provide the basis for constructing testable hypotheses and for obtaining factual evidence as to the physical, chemical, and biological makeup of the world. . . . But Mr. Berlinski asks: "Why did the firefly discover bioluminescence?" To the best of my knowledge there is no evidence to suggest that fireflies went into laboratories and discovered bioluminescence. Mr. Berlinski also asks: "Why is the Pitcher plant carnivorous but not the thorn bush?" . . . To which biologists respond: what are the evolutionary forces at work that resulted in the Pitcher plant adopting carnivory? In examining this question, biologists have found that carnivory is a means whereby Pitcher plants can grow in nutrient-poor soils: carnivory provides a means of obtaining phosphates and nitrates. The story of thorn bushes is different: for these species, found in dry, arid environments, the more pressing evolutionary forces apparently involved protection from desiccation and excessive herbivory. Thus, the more immediate survival mechanisms for each species evolved differently and conferred different survival advantages. . . .

Finally, Mr. Berlinski asks: ". . . who on the basis of experience would be inclined to disagree" with his conclusion of deliberate design? I would!

Department of Biological Sciences
University of South Alabama
Mobile, Alabama

ROBERT SHAPIRO:

In "The Deniable Darwin" David Berlinski has captured, in elegant prose, the complexity of living things. This complexity is displayed in both their structure and behavior, and is already overwhelming at the level of one-celled organisms. Mr. Berlinski quite justifiably scolds those biologists who exchange skepticism for dogma and proclaim that our current level of understanding is enough to provide a full account of the origin and development of life.

As his article develops, however, we recognize that the author . . . has a hidden agenda, the promotion of an idea that falls outside the bounds of scientific investigation: Intelligent Design. In advocating his cause, Mr. Berlinski juxtaposes Darwin and Design as if they were the only possible explanations for the intricacy of life, and then defines the Darwinian side to his own satisfaction. If we choose this answer, we must presume that natural selection is the only mechanism that drives evolution, and that only "sheer dumb luck" lies at its heart.

On the other side, no details are offered concerning the identity of the Designer or the means and mechanism by which He created. I suspect that the author does not wish to specify a power that operates within this universe and according to its laws, such as the intelligent silicon chip once proposed by Fred Hoyle. Mr. Berlinski prefers a supernatural explanation. He is not content to sustain his religious convictions by faith alone but, in the style of the creationists, harasses those who seek a natural explanation for origins and evolution. The creationists offer an even more polarized two-way choice, of course. They would have us select between Darwin and chance on the one hand, and a literal interpretation of the Bible with a 6,000-year-old universe on the other. . . .

Fortunately, there is a third alternative. . . . In this view, an organizing principle exists in nature and governs the rise of complexity in life, and in many other natural phenomena. The roots of this idea lie in several philosophies, but it has taken on a new respectability with the development of mathematical theories of complexity.

An excellent popular account of this field and its application to evolution is given by the physicist Stuart Kauffman in his book, *At Home in the Universe*. Kauffman argues that both self-organization and natural selection have driven evolution; the development of increasing complexity in life is an expected result of these mechanisms.

Unlike Intelligent Design, self-organization can be subjected to the test of experiment. Few efforts have been made to explore this process, perhaps because complexity theory is new and scientists have been too devoted to the more traditional form of Darwinism. Yet I believe the concepts have considerable potential, particularly in the origin-of-life field, and I hope they will gain greater attention in the future. Questions of origins and evolution can then move out of the debating hall and into the laboratory, where they belong.

Department of Chemistry
New York University
New York City

PAUL H. RUBIN:

One reason for reading COMMENTARY is that it supplies a rational, intellectual analysis of important issues. Therefore, it was surprising and dismaying to read David

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Berlinski's anti-intellectual attack on Darwinism, one of the great intellectual accomplishments of the human mind. . . .

"We never attribute the existence of a complex artifact to chance," says Mr. Berlinski. But evolution does not imply *only* chance. Mr. Berlinski makes it sound as if the alternatives were either chance or conscious direction; many systems, however, are complex and yet not planned. In my field of economics, for example, the entire structure of a market economy is neither designed nor planned. . . . Language itself, which Mr. Berlinski spends much time discussing, is not planned and yet is a highly complex artifact, and one which Stephen Pinker and others have shown to be a product of Darwinian processes.

Mr. Berlinski asks: "Could a system we do not completely understand be constructed by means of a process we cannot completely specify?" He answers, "we do not know." But it is not only evolutionary biology which presents this conundrum. All science is an attempt to explain systems we do not fully understand with processes we cannot completely specify. Unless we proceed as if the answer were yes, we cannot do science. . . .

Mr. Berlinski calls the human mind "conscious, flexible, penetrating, inscrutable, and profound." He is of course correct. But today we are at the threshold of truly understanding the source of this mind, as the new science of evolutionary biology is beginning to explain it. Indeed, it is particularly perverse to publish a critique of Darwinism just as its practitioners are beginning to use it to explain human behavior in a remarkable and truly profound way. . . .

Emory University
Atlanta, Georgia

JOHN M. LEVY:

David Berlinski does not like the philosophical and theological implications of Darwinism and so tells us that it plays the same role in the "economy of belief" as does the biblical account of creation. In that it supports a world view, perhaps that is so. But what is missing from his article, and what may not be apparent to the reader without some education in biology, is how massive is the evidence for an evolutionary scenario. The student in comparative anatomy cannot but be struck by how often similar forms appear in the structure of one species after another and how the same structure gradually changes form and sometimes function as one proceeds from lower to higher forms.

The student of embryology sees traces of evolution throughout the subject. At one stage human embryos have fishlike features. The early human embryo has an arterial pattern like the arteries in the gill arches of fish. As the embryo matures, that pattern changes to produce the mammalian pattern of the arteries in the thorax and neck. A comparable transition can be seen if one looks across species from fish to amphibian to reptile to mammal. Biology students are taught "onto-geny recapitulates phylogeny" (the history of the individual repeats the history of the phylum) because the evidence of it is so overwhelming. . . .

Mr. Berlinski makes much of gaps in the fossil record, but consider the following: for many years biologists were convinced that aquatic mammals had evolved from terrestrial mammals but there were many gaps in the record. They could not provide the path. Then pieces of fossil evidence started turning up in Egypt, Pakistan, and elsewhere. Commenting on these, Stephen Jay Gould . . . states:

> I am absolutely delighted to report that our usually recalcitrant fossil record has come through in exemplary fashion. . . . The embarrassment of past absence has been replaced by a bounty of new evidence—and by the sweetest series of transitional fossils an evolutionist could ever hope to find.

Terrestrial mammals returning to the sea to feed on fish and then evolving the aquatic features of whales and porpoises sounds like a "just-so" story. But the fossil evidence suggests that it really is "just so." To base one's rejection of Darwinism on gaps in the fossil record is to place it on a very erodable base. . . .

Living creatures in their incredible complexity are mind-boggling. How a sequence of bases in a double helix can specify that you will have a dimple like your grandmother's is mind-boggling. But where the evidence for the hypothesis is so strong, and where various different types of evidence reinforce one another, I do not think that rejection-because-of-bogglement is the wisest course.

Blacksburg, Virginia

MARTIN GARDNER:

David Berlinski's spirited attack on evolution, like Phillip E. Johnson's earlier book, *Darwin on Trial*, contains one huge, glaring omission. Nowhere does he tell us what brand of creationism he supports. It is as if someone wrote an article blasting evidence for the earth's roundness but refused to say what shape he thought it was.

Like Johnson, Mr. Berlinski seems to think that the punctuated evolution of Stephen Jay Gould and his friends somehow damages the Darwinian view that all life evolved by gradual small changes. The jumps in Gould's theory are, of course, jumps only relative to the extremely long periods during which certain species remained stable—trilobites, for example. Gould's jumps are tens of thousands of years, arising from tiny mutations that for reasons still unclear occur more rapidly than usual. Darwin's bulldog, Thomas Huxley, was well aware of such jumps, and they have provided fuel for creationists from Darwin's day until now. . . .

I assume that . . . Mr. Berlinski is not a young-earther who thinks all the fossils are records of life that

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perished in Noah's Flood. But what exactly *is* his creation scenario? There are three possibilities.

1. God created each individual species by fiat—that is, they had no ancestors. Because there are millions of insect species alone, this requires God to perform many millions of miracles. I cannot believe that . . . Mr. Berlinski favors such a view.

2. Creations occurred over millions of years but only for broad classifications of life, such as plants, fishes, reptiles, birds, mammals, and, above all, humans. Gradual evolution could then take place within those broad categories to give us different species of reptiles, birds, and so on.

3. Each mutation (Darwin, of course, did not know about mutations) is a creative act of God. Instead of relying on a combination of chance and natural laws, as almost all liberal Christians and Reform Jews believe, God's method of creation was to direct each mutation in a way it could not have occurred naturally. This is difficult to defend because, in the light of the beliefs of theists like myself that all natural laws were created and are upheld by a transcendent deity, there is no more need for God's special interventions than there is a need for Him to give periodic pushes to stars and planets, as Newton argued, to keep their orbits from deteriorating. . . .

One final question. Does Mr. Berlinski think the first humans had parents who were beasts, or no parents at all? . . .

New York City

HERBERT GINTIS:

. . . What is David Berlinski trying to say? He never denies evolution. He never denies that natural selection occurs, or that it is important. He never provides an alternative theory of genetic variation. Actually, his purpose is stated almost as an afterthought, in the final paragraph of his piece. Here he quotes Richard Dawkins's pronouncement, "Darwin made it possible to be an intellectually fulfilled atheist," and Mr. Berlinski himself remarks that "the theory of evolution" plays a "singular role in the life of our secular culture. . . ."

Fortunately, it is not necessary to deny Darwin in order to affirm the validity and importance of a spiritual (i.e., nonsecular) culture. Spiritual life has a validity of its own, neither supportive of nor in conflict with natural science. Faith, love, beauty, and other cherished dimensions of human life are experienced realities whose truth does not depend on this or that fact of nature.

Moreover, if one's belief in God depends on the inability of science to explain the world (I do not believe it should), science gives one ample support for one's faith. Even *with* Darwin, we are *far* from able to explain the emergence of consciousness from the history of the modification of the structure of DNA molecules. . . .

I think Darwin made it *easier* to be a nonbeliever, undercutting one of the most powerful arguments for the existence of God—the so-called "argument from design." I remember personally, in first grade, being made to repeat every morning in our school prayer, "for it is God who has made us, and not we ourselves," and thinking how strong an argument that was. But by the time I became an adult, and came to appreciate the theory of natural selection for the brilliant monument to the human intellect that it is, I had already gone far beyond the argument from design in grounding my own spiritual life. Denying Darwin is not only intellectually impossible, it is spiritually unnecessary.

University of Massachusetts
Amherst, Massachusetts

DAVID P. BABCOCK:

David Berlinski is refreshing in attacking evolution without assuming the correctness of its most frequently offered alternative, the literal truth of Genesis 1. Indeed, he is somewhat dismissive of creationism. So far, so good. But where Mr. Berlinski then gets into trouble is in failing to discuss what possibilities other than evolution remain after creationism is set aside. He seems to accept the general validity of science; fine. But given that, he might be expected to offer some explanation for the observation that species have arisen at different times. He does not.

Perhaps we are to infer, from his acceptance of the Argument from Design, that his designer from time to time flings new species onto the earth out of whole cloth. This is not an inherently ridiculous idea. It is, however, rather more embarrassed by lack of evidence than is the evolutionary hypothesis. Moreover, it is just the understanding of such evidence as does exist that caused evolutionary biologists to suspect that Piltdown Man was a fraud when their intellectual opponents had no scientific reason for doing so. And the evolutionary biologists were right. If their opponents have ever had such success with their inferences from the fossil record, history does not record it.

Boulder Creek, California

EUGENIE C. SCOTT:

. . . The content of David Berlinski's article does not differ from more traditional creation-science material, though his tone is more genteel and his writing a lot more literate. . . . But true to the creation-science genre, his approach consists of constructing strawmen, then knocking them down with misinterpreted, faulty, or nonexistent data as well as carefully selected quotations from evolutionary scientists. . . .

For example, the "intermediate/transitional-fossil" strawman is a staple of anti-evolutionist rhetoric. . . . Because their theology says God created all living things as separate "kinds," creationists assert that there can be no transitional fossils, and no descent with modification. As a result, they persist in their inability to recognize mosaic specimens. Show them a fossil like the part

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bird/part dinosaur *Archaeopteryx*, and they will claim that because it has feathers, it is "100-percent bird," regardless of the fact that specimens which lack clear feather imprints are indistinguishable from small, toothed, clawed, bipedal dinosaurs. Show them a hominid fossil with a small brain, teeth similar in some respects to those of an ape and in others to those of a human, and a pelvis requiring bipedal locomotion, and they will see "just an ape." . . .

Readers can write me at NCSE for a bibliography of articles and books that refute the Cambrian-explosion argument, refute the impossibility of amino acids coming together to form a protein, explain the difference between chance and evolution, discuss why William Paley's argument from design has been supplanted in science by arguments based on natural causes. . . .

One can be a believer and accept evolution. Articles like Mr. Berlinski's confuse rather than elucidate issues. Mostly, however, they perpetrate bad science in a society that needs more science literacy, not ignorance.

National Center for Science Education
El Cerrito, California

EDWARD T. OAKES, S.J.:

David Berlinski's superbly written exposé of the loaded logic embedded in Darwin's "explanation" for the origin of species raises once more the issue of its replacement: if Darwinism is as inadequate as Mr. Berlinski claims, what *is* the engine of evolution?

I was raised in a Jesuit school system that pretty much took evolution for granted, and indeed seemed rather proud of the work of the Jesuit paleontologist Teilhard de Chardin in reconciling Christian doctrine with evolution. . . .

I awoke from my own Darwinian dogmatic slumbers only late in life, when I first read Gertrude Himmelfarb's *tour de force* of a biography, *Darwin and the Darwinian Revolution*, now sadly out of print. Miss Himmelfarb makes many of the same points that Mr. Berlinski does and documents how these same objections were very much alive among Darwin's fellow scientists in the Royal Society. . . . Yet still, Darwin's theory won out, and that requires explanation, for which I can offer no other hypothesis than the even greater weakness of its perceived alternative: creationism.

According to the Himmelfarb thesis, nothing was more crucial to the eager hearing the *Origin* received than the appearance the year before of *Omphalos* by Philip Gosse, a professional geologist and (speaking *avant la lettre*) fundamentalist Christian minister. This peculiar book argued—for the first time and in explicit answer to Darwin, with whose theories Gosse was already professionally familiar—that there had been no incremental change in the earth's surface or gradual development of organic life. The *semblance* of change and development had been *imprinted* on the earth at the very moment of the act of creation. The reaction of the scientific and educated public to this bizarre, even grotesque, thesis was predictable. In Miss Himmelfarb words: "The howl of execration that [might have] awaited Darwin was let loose on Gosse [instead]. . . ."

One of the most fair-minded historians of this controversy is Peter J. Bowler, who notes in his book *Evolution: The History of an Idea*, that Darwin's proposal *needed* creationism as a foil:

> Why, then, did paleontologists accept evolution? The answer seems to be that enough fossil evidence turned up to convince them of the futility of creationism, even if it did not prove evolution. The evolutionists could predict that if, for instance, birds

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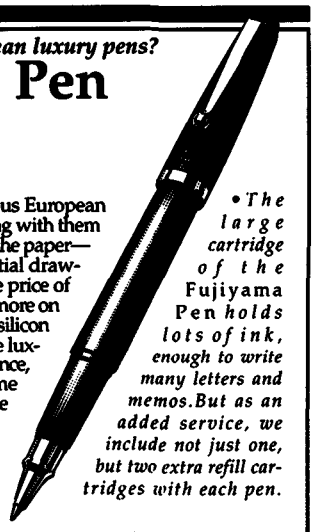

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have evolved from reptiles, then one might hope to find a fossil with characteristics intermediate between the two classes. Creationists, by contrast, had a vested interest in maintaining the absolutely distinct characteristics of existing groups and were unwilling to postulate intermediates in the past. . . .

Of course, as Mr. Berlinski points out so effectively, Darwinism lacks predictive power too, but I cannot help feeling that we are dealing with two different orders of unpredictability here. After all, meteorology and history lack true, rigorous predictive power, but no one accuses either discipline of alchemical chicanery just because the weatherman cannot predict a hurricane two weeks from now or a historian cannot predict where the next tin-horn dictator will overthrow a constitutional government. After all, evolutionary biology is, like history, a *retrospective* science, one whose search for causes must by definition terminate in the present pre-given status quo. . . .

I can only say in closing that if I am to join the law firm of Himmelfarb, Berlinski & Bowler, I would first have to say: "Give me a replacement and I'm yours."

Regis University
Denver, Colorado

KENT GORDIS:

The strangely florid style and lack of coherence of David Berlinski's article obscures a rather simple situation.

When Darwin's theory of evolution was formulated in the 1850's, it was a good example of a Popperian scientific hypothesis— in Karl Popper's words, "an imaginative or even mythological conjecture about the world." Today, this hypothesis has been convincingly refuted on both empirical and theoretical grounds.

The empirical grounds are the total absence of fossil evidence of the transitional forms predicted by the theory, the existence of which is practically the definition of "evolution."

The theoretical grounds are the vanishingly low probability that random selection could explain the existence of life forms, the simplest of which is of extreme complexity. This point is vividly conveyed by Fred Hoyle's metaphor, quoted by Phillip E. Johnson: "that a living organism emerged by chance from a pre-biotic soup is about as likely as that a tornado sweeping through a junkyard might assemble a Boeing 747 from the materials therein."

Mr. Berlinski quotes Richard Dawkins, one of the leading contemporary Darwinists, as follows: "Darwin made it possible to be an intellectually fulfilled atheist." In fact, the refutation of Darwin's theory would threaten the faith of all those whose world view is based on "naturalism," the view that only natural or material phenomena are real, a class which includes not merely atheists like Dawkins but most agnostics, as well as many people professing "modern" religious beliefs. This, of course, is the reason Darwin's theory of evolution, although refuted as a scientific hypothesis, has become a naturalistic dogma whose transmission from generation to generation is seen as a sacred duty of the scientific clergy. . . .

New York City

J. R. DUNN:

One point not mentioned in David Berlinski's article is the fact that natural selection is the sole scientific theory that cannot be superseded. Other theories, no matter how well-established, are commonly overthrown or subsumed in light of later discoveries, much as Newtonian mechanics became a special case within the framework of Einsteinian relativity. But natural selection is presented as the last word in its field, monumental and unassailable, with all ensuing work subordinated to the original thesis. This is a complete reversal of the accepted method of scientific inquiry, one that effectively turns Darwin into a prophet and his theory into a pseudo-religion—in a word, an ideology.

This explains why vicious infighting goes on among evolutionary biologists, so similar to doctrinal battles among religious sects; why natural selection is presented as a universal doctrine, dominant far beyond the boundaries of biology. . . and why contradictory findings are jammed into the basic theory with no attempt at consistency. . . . Lastly, it goes a long way toward explaining the incessant hostility that evolutionary biologists display toward religious faith—one does not see many astrophysicists or cosmologists crowing about their victories over the fundamentalists. . . .

The vast majority of scientific theories prevalent in the mid-19th century have been supplanted. How much longer will Darwin's immunity to fundamental scientific principles continue?

New Brunswick, New Jersey

ARTHUR B. CODY:

It was courageous of COMMENTARY to publish David Berlinski's much-needed questioning of evolutionary theory. It is important to have serious inquiry rather than religious dogmatism allowed into a debate over what seems to be a doctrine scientists are reluctant to examine. One unfortunate thing creationism has brought about is the hunkering down of biological scientists and others in a position which will allow no place for expressions of uncertainty. As a result, writers in all sorts of fields—biology, ethics, law—do not hesitate to justify their observations by teleological reasoning under the guise of Darwin's theory of natural selection, confident that none will propose an embarrassing query. . . .

One hopes that David Berlinski's analysis of an important element in the neo-synthetic theory of evolution will be taken as needed ventilation, letting both light and air into this dark and darkening area of science. I fear instead what he will get

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are hysterical vituperation and angry shouts to close the window.

Santa Cruz, California

TOM SOUTHWICK:

It is surely beyond exasperation for science writers, being deeply invested in the conventional wisdom of blind evolution, to encounter doubts not only from a science-illiterate general public, but also challenges from their own ranks. They would prefer to identify all skeptics of evolution with young-earth biblical literalists. I am sure David Berlinski will be chastised for his brilliantly evocative tour through the evidential ruins of Darwinism, with its grand extrapolations from essentially trivial observable facts, and its simply unbelievable claim that chance—unguided natural processes—could organize the information requirements of even basic biological structures, let alone complete functioning organisms.

As Mr. Berlinski points out, chance ("pure dumb luck") is the "beating heart" of evolutionary theory, just as Jacques Monod clearly stated, and Richard Dawkins in turn has presumed to deny. The truth is that no hint of design is permitted; those who would propose a hybrid, as in "theistic evolution," are not really in the debate; and their accommodation to the regnant evolutionary view assumes that the "fact" (read, "proven fact") of evolution is inarguable.

But chance is not a satisfactory engine of the generation of life from nonlife, or the presumed grand procession of creatures from simpler antecedent forms. I appreciate the highly serviceable presentation Mr. Berlinski makes of the staggeringly great improbability involved: happening by blind chance upon the one useful configuration of chemicals, in a spot the size of a dime, on an earth-sized planet otherwise covered by uselessness.

I would add that this dime must be found for just *one* successful molecule to emerge; just *one* amino acid string to form *one* useful protein. To make a second protein, we must start over; and just happen to find that dime again, having no idea where we found it before, or even that we did find it; and having found it, our second spectacular success must also accidentally set aside our result such that it will combine usefully with our first success . . . and so on, passing quickly into the realm of plain impossibility.

Actually, it is even worse: even allowing for the eons of time required to give verisimilitude to the evolutionary model (typically four billion years), not one useful strand of DNA could have organized itself by accident. As the microbiologist Michael Denton puts it in *Evolution: A Theory in Crisis*, to suppose that chance processes could create *life* (a far greater challenge) "is simply an affront to reason." In 1981, when Francis Crick (Mr. DNA) seriously proposed the it-came-from-outer-space explanation for life on earth, it was at least in part to expand (greatly) the time available to evolution. . . .

It seems clear that intelligence designed life; and even the graybeards of the evolutionary cathedral must propose, as Mr. Berlinski puts it, a Head Monkey, overseeing vast numbers of ordinary monkeys banging uncomprehendingly at their keyboards, "striving" for that line from Shakespeare, and the Head Monkey discerning (accidental) "targets" being reached for, so as to preserve the results of successful aiming, thereby carrying out the selection process. Dumb luck *must* have also just blundered, an incalculably great number of times, into this highly sophisticated decision-making mechanism. Nothing recognizable as "evidence" is presented for this; evolution simply requires it, or something like it. This is philosophical musing, not science. But it is proposed, with no cognitive dissonance, as having the imprimatur of truth that science confers.

The debate over origins will persist, not because biblical creationism is convincing science, but because Darwinism (chance) is finally seen as an alluring impossibility. Even as it is passionately resisted, the God solution will stand as a reasonable interpretation of the emerging design paradigm. . . .

Milltown, New Jersey

JOHN WIESTER:

Thank you for David Berlinski's insightful article. His examples of Darwinian "just-so" stories and fuzzy logic are both instructive and amusing. As a science educator and parent I am not amused, however, by the extent to which both science and reason are being abused by the Darwinist establishment in the education (?) of our children. The following excerpt from an official 1995 Statement on Teaching Evolution illustrates my point:

> Evolutionary theory, indeed all of science, is necessarily silent on religion and neither refutes nor supports the existence of a deity or deities. Accordingly, the National Association of Biology Teachers, an organization of science teachers, endorses the following tenets of science, evolution, and biology education: "The diversity of life [i.e., all life] on earth is the outcome of evolution: an unsupervised, impersonal, unpredictable, and natural process of temporal descent with genetic modification that is affected by natural selection, chance, historical contingencies, and changing environments."

Now that is just double-talk. Of course the claim that life is the product of an "unsupervised" process of evolution has important religious implications, and of course it goes way beyond the empirical evidence. The bogus claim of "silence" on religion serves only to protect these anti-religious statements from the critical analysis they deserve. . . .

Science Education Commission
Buellton, California

NANCY R. PEARCEY:

David Berlinski's piece on Darwinism was colorful and witty, but

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his postscript topped it all, with its mock claim that all modern novels have descended from *Don Quixote* by a series of copying errors. Mr. Berlinski weakens his case unnecessarily, however, when he denies that DNA is "completely comparable" to a language. The application of information theory to biology reveals that the genetic code is structurally identical to human codes. That is, DNA is not merely like a language, it is a chemical language. To explain its functioning, biologists have been obliged to borrow the terminology of editors and linguists. They speak of DNA as a code or symbol system; they speak of molecules that copy and translate the message; they speak of proofreading functions and error correction.

The upshot is that the origin of life and its myriad forms must be recast as the origin of biological information. The DNA of even the simplest bacterium contains as much information as the entire *Encyclopedia Britannica*. Mr. Berlinski's spoof puts the onus on Darwinists to explain how new information can emerge through the accumulation of errors in a text. And if that is a preposterous way to account for the origin of *Madame Bovary* or *Anna Karenina*, it is even more implausible when it comes to the origin of living things.

The Wilberforce Forum
Reston, Virginia

DAVID J. MANDEL:

David Berlinski's article, "The Deniable Darwin," is brilliant, clear, witty, wonderful. His postscript on the evolution of *Ulysses* from *Don Quixote per Borges* is marvelous. . . .

New York City

LARRY EUBANK:

David Berlinski has made many good points about evolutionary theory. I am always taken aback by the unquestioning certainty displayed by evolutionists in the face of a theory so fundamentally, intuitively preposterous; by the solemn assurances of TV broadcasts on nature that their fairy-tale rationalizations are "science"; and by the intellectual thuggery of college professors who insist that evolution is scientific fact and that we *must* believe it. . . .

Jeffersonville, Indiana

HENRY SHERMAN:

David Berlinski's brilliant "The Deniable Darwin" riveted my attention. I have waited 40 years to read such an article.

Admittedly no better schooled than most other aspiring intellectuals in the fine points of Darwin's theory, I have never been able to accept its explanation of how the fantastic profusion of living and long-dead species evolved from that first lonely cell, aimlessly drifting in the primordial soup.

Something always stuck in the craw—it would just not go down. Why did the known fossil record fail to document a single example of the continuous evolutionary change proposed by the theory? If evolutionary mutation took place in response to changes in the external environment, how could one account for the bewildering abundance and variety of species surviving side by side for untold millennia in the *same* environment? Why, as Mr. Berlinski suggests in his closing sentence, does acceptance of Darwin's theory require an act of faith similar to that demanded of those who confidently place their trust in biblical (and other) accounts of creation?

For me, there was always too much that distinguished a trout from a tiger; an unfathomable distance between a mouse and a Mozart. Unhappily, there appeared to be nothing between the no-longer acceptable beliefs of the creationists and the Darwinism which seemed to have cleared the secular field of any other explanation of life on our planet. Bereft of the consoling beliefs of my fathers in divine intervention; dismissive of the pallid nostrums of the deists who see God in everything and thus, ultimately, in nothing; somehow sensing in Darwinism the illusionist's trick, which makes the impossible appear plausible (Mr. Berlinski's witty "*ta-da!*"), I found it rather lonely out there.

To be sure, Mr. Berlinski does not offer an alternative to the theory he so drolly declares deniable. Nor does he offer much comfort to those of us left out in the cold by our inability to accept any of the other answers to the perpetual questions: What are we doing here? How did we get here? Where are we going? However, by shaking the Darwinian tree with such vigor, he may have helped once again to make respectable to nonbelievers the proposition that man, after all, may have more soul than a snail. And, for that, we must thank him.

New York City

TOM BETHELL:

David Berlinski's article is but a harbinger of the great brewing controversy over evolution. The truth is that, although we have long been told that evolution is a "fact," there is almost no evidence to support it. In 1981, Colin Patterson, senior paleontologist at the British Museum (Natural History), said that he did not know of any such evidence; subsequently he has amended this only slightly. The claim that evolution is a fact depends on a definition that is so weak as to be valueless: evolution becomes "change over time." The frequent reference to those *biston* moths in England—in a polluted environment, the dark or camouflaged variety became relatively more numerous than the light variety—shows how feeble the evidence really is. If the evolutionists had something more persuasive, we would have heard about it on a daily basis.

Darwin's great claim to fame was his discovery of the alleged mechanism of evolution—natural selection. But as Mr. Berlinski notes, this turns out to be a disguised tautology. The fittest survive, and survival

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is the criterion of fitness. Change was equated with improvement and the Darwinian discovery involved little more than the importation of progress into biology. Now we no longer believe in the idea of progress, and faith in biological evolution may be jeopardized as a result.

Hoover Institution
Stanford, California

RABBI DANIEL LAPIN:

Publishing David Berlinski's "The Deniable Darwin" was an act of great intellectual courage. You have fired a shot in what is becoming a great moral revolution, and it will be heard around the world. Discovering that Darwin is deniable might tell us a little of how primitive life began. It would tell us everything about how modern life should continue.

Today's greatest question is whether humans have been touched by the divine and thus possess moral judgment or whether we are just sophisticated animals. Upon the answer depend most important matters of public policy. Our view of criminals must depend upon whether we consider them to be acting naturally or in a depraved and evil manner. Seventh-grade sex-education classes would look very different if we knew of no reason to expect children to behave like animals. Come to think of it, all classes and indeed all schools would look different, too. The debate, thus, is not really over the mating habits of the male redback spider (*Latrodectus hasselti*), it is over the mating habits of American urban men (*Homo sapiens*).

On July 2, 1863, a thirty-four-year-old professor at Bowdoin College led his regiment to glory at Gettysburg where he ordered the brilliant charge that saved Little Round Top and avoided a Union catastrophe. After the war, Joshua L. Chamberlain was elected governor of Maine and later served as president of Bowdoin College. He wrote these words: "I do not fear these men of science, for after all they are following in God's ways. . . . I would say that [scientific] laws are God's ways seen by men." Remember that *The Origin of Species* had been published just four years earlier.

Today, Cornell University's William Provine, a leading historian of science, insists that the conflict between science and religion is inescapable. Specifically, he states: "Modern science directly implies that there are no inherent moral or ethical laws, no absolute guiding principles for human society . . . we must conclude that when we die, we die and that is the end of us."

Understandably, passions flare over this debate. It will ultimately resolve whether people must choose between science and religion or whether they can simultaneously rejoice in the Creator's morality and His methods.

Chamberlain and Provine cannot both be right. America will ultimately follow the vision of only one. Which one will be decided by the outcome of the intellectual and moral war you have courageously joined. Until now the war was being ignored. COMMENTARY's June 1996 issue forever eliminates that option.

Toward Tradition
Mercer Island, Washington

MICHAEL J. BEHE:

David Berlinski and COMMENTARY both deserve much credit for shining a light on the woefully underexamined theory that supports much of modern thought. I found his arguments to be quite compatible with my own thinking concerning the systems I encounter daily as a professional biochemist and about which I have written in *Darwin's Black Box*. Indeed, just as the pleasing shape of a jetliner belies

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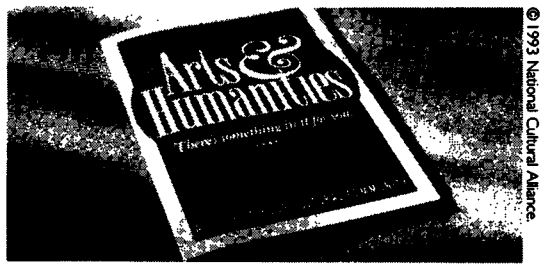

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the complexity of its internal organization, so the complexity of life mushrooms as one gets closer to its foundation. The shape of the eye, which Darwin tried to explain, pales in comparison with the interactions of rhodopsin, transducin, arrestin, rhodopsin kinase, and other proteins in the visual cascade. Explaining how the swimming behavior of a whale might be produced gradually (if anybody ever succeeded in doing this) would be a walk in the park compared to explaining the bacterial swimming system—the *flagellum*, which requires more than 40 gene products to function.

Most people consider Darwinism, whatever its faults, to be science. Yet in an interesting way they are wrong—at least in my area of biochemistry, the study of life's foundation. Scientific results get reported in science journals, like *Nature*, the *Journal of Biological Chemistry*, and so forth. But if you search the science journals, as I have done, for detailed explanations of how particular, complex biochemical systems (such as, say, the blood-clotting system or intracellular-transport) were produced, you come up completely empty-handed. Astonishingly, science's own journals contain no explanations. Since science is found in science journals and Darwinian explanations are absent, Darwinism is not science.

Department of Biological Sciences
Lehigh University
Bethlehem, Pennsylvania

PHILLIP E. JOHNSON:

The media stereotype of the evolution controversy is that it pits "science" against fundamentalist "religion." It would be more accurate to say that Darwinism is the most important of the materialist ideologies—Marxism, Freudianism, and behaviorism are others—which have had done so much damage to science and society in the 20th century. The theory persists in spite of the evidence because Darwinism cannot survive without it. COMMENTARY deserves great credit for helping to break the stereotype by publishing David Berlinski's fine essay.

Public understanding of the defects of Darwinism is limited because the educators think it their duty to indoctrinate, and prestigious propagandists like Richard Dawkins protect the theory effectively with ridicule and bullying. (This method of dealing with criticism is itself a hallmark of bad science.) Readers who are not intimidated should be sure to read Michael J. Behe's *Darwin's Black Box*, which shows why the mutation/selection mechanism has been all but abandoned as an explanation for the irreducible complexity found in the biochemistry of organisms. There is also a new journal called *Origins and Design* (website http://www.arn.org/arn).

The fall of Darwinism will be the big story of the early 21st century—learn about it now, and be ahead of the curve!

School of Law
University of California
Berkeley, California

JEFFREY SATINOVER:

A theory becomes widely accepted because it explains so much. This is exactly why Darwinian evolutionary theory has triumphed, especially its core proposition: that new living forms emerge over time exclusively via competitive, "natural" selection. The theory is so powerful that it has been able to account for variations at the level of DNA and protein morphology, even though it was formulated long before anyone knew anything about either. Indeed, "genetic algorithms," mathematical techniques modeled on competitive selection, have recently been developed and used to solve previously intractable problems in a growing number of non-biological domains.

So massive is the accumulation of natural data adequately accounted for by competitive selection, so impressive is its capacity to mimic goal-directed, problem-solving intelligence in spite of being a "dumb," mechanical method based upon random variation, that it should come as no surprise when critics of Darwin are perceived as willfully ignorant, or worse. This must certainly be the gist of what is being leveled at David Berlinski and at COMMENTARY.

In fact, the challenges to the principle of competitive selection are of varying sophistication. The crucial challenge to Darwin is not the one which asks whether God created the world in 144 hours, and then cleverly buried under its surface a bunch of rocks made to look like animal bones so as to ensure tenure to a group of professors 5,700 years later. The essential challenge is, rather, this: is there any evidence of anything at all at work in the world which is, however, not of the world? And if there is evidence of any such foundational anomalies, is there further evidence that this "something" has a central (not incidental or unnecessary) role in the processes by which the forms of life have come into existence? For if there is such evidence, then however machine-like much, or even most, of the universe is, it is not wholly a machine, and neither is man.

There are such anomalies, of both sorts. They may be put together as follows: the degree of unitary coherence in the stage-by-stage emergence of higher and higher levels of nervous-system organization (that is, brain structure) does not appear wholly explainable by purely physical influences, however much can in fact occur in the way of self-assembly via nonlinear, stochastic (random) processes given (a) the amount of time since the emergence of life of earth and (b) the absence of any form of teleology or preprogramming (in which knowledge of a desired end influences the choice of and application of means).

So much does competitive selection explain that it has long been presumed to be merely a matter of time before this anomaly will be reduced as well, and it has therefore

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been shunted aside as unimportant. After all, most of the interesting and fruitful projects in modern science have borne their fruit by presuming as a working hypothesis that the machine-model of existence is true, and by following up on the consequences, and there is simply no gainsaying the power of the successes thus achieved. But the fact remains that the most interesting discoveries of 20th-century science have in fact provided evidence of exactly the opposite.

For 80 years now, ever since the great and utterly intractable anomalies of radiation and radioactive decay confounded the almost completed structure of determinism and forced the adoption of quantum mechanical principles (an oxymoron, since quantum, by definition, means not mechanical), the world's greatest scientific minds have been tying themselves in knots. They were quickly able to show just how outrageous the implications of quantum mechanics are; they waited patiently for a technology sophisticated enough to do the experiments they were certain would confirm the theory's falseness. . . . But in the last ten years, as the technology has reached the necessary level, many quantum hypotheses have been tested, and been proved correct. . . .

Now, Darwinian theory and its variants are corollaries to the machine-model, and David Berlinski and the editors of COMMENTARY deserve kudos for attacking head-on the notion that the fundamental principle of Darwinian theory is beyond rational dispute. The simple fact is that, however uncomfortable people may feel at having to take seriously points of view that remind them of religious fundamentalism, modern science itself has long recognized that the unquestioned hegemony of mechanical determinism is open to question, and this directly affects evolutionary theory. . . .

The question may be put as follows: can one treat all of life as a gigantic random machine, a huge genetic algorithm "aimed" at solving the "problem" of survival and self-assembly, whose outputs (morphologic categories; species) can be sufficiently accounted for by purely random events operating according to the principles of "nonlinear" (chaotic) dynamics? Or are the results more akin to the solutions produced by the emerging, quite serious field of quantum computation: "impossible," noncomputable results that require "something more" than the physical universe to arrive at? Many serious scientists believe that the latter proposition is not on the level of the Scopes "monkey trial," but of the utmost significance.

COMMENTARY is not a scientific journal, but let me give a brief taste, just to let it be known that the debate is real. In 1992, Koichiro Matsuno of the department of bioengineering at the Naguaka University of Technology in Japan published an article in *BioSystems* (a high-level journal of theoretical biophysics) entitled, "The Uncertainty Principle as an Evolutionary Engine." In it he demonstrates that there is a peculiar uncertainty relationship between local quantum fluctuations (these give rise to gene-level mutations) and final global morphologies. In brief, the "needs" of the final forms "influence" (in the peculiar meaning that this word takes on when dealing with quantum phenomena) the fluctuations necessary to generate the solutions.

It is precisely this kind of "impossible," nonmechanistic influence which quantum mechanics has repeatedly demonstrated at the heart of all physical systems. Serious scientists now entertain the possibility that the universe itself might be rather like a freely-acting agent (a pantheistic point of view, as it were); some consider that this "agency" might more precisely be spoken of as residing elsewhere, or being other, than any physical system, however large (a more theistic point of view, and less popular, though not for reasons of evidence).

The proposition that evolution is in some way guided by a kind of "intentionality" analogous to our own (not wholly determined: just regular nudges to keep it on this track instead of that one) is far from absurd. . . . Matsuno and others may be correct or they may be wrong, or partially both. But it is long overdue for readers to understand that they are not fools who insist that there is more at work in the universe than meets the modernist eye. Just what kind of central organizing principle will in fact arise to replace the emptiness of today's still-regnant Cartesian model remains to be seen, but construction is well under way.

Kudos again for the first public notice to appear in so prestigious a venue as COMMENTARY; and thanks to David Berlinski for risking it.

Westport, Connecticut

RUSSELL ROBERTS:

I want to thank David Berlinski for his elegant exposé of the Darwinian emperor and his meager amount of clothing. Biologists and the rest of us often confuse what I would call micro-evolution (animals have coloring that makes them hard to spot in the wild) with macro-evolution (the tree of life that Mr. Berlinski mentions where man makes his orderly climb out of the primordial soup). There is a great deal of evidence for the former and precious little for the latter. Where are those pesky intermediate forms?

People often speak about the theory of evolution as if it were a "fact" or "proven." Alas, it is only a theory, a useful way of organizing our thinking about the real world. When theories stretch too far to accommodate the facts, a paradigm shift is usually forthcoming. As Mr. Berlinski notes, biologists have trouble imagining an alternative paradigm to evolution. This may explain the vehemence with which they greet criticism. Perhaps they too are uneasy with the emperor's wardrobe.

Olin School of Business
Washington University
St. Louis, Missouri

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M. P. SCHÜTZENBERGER:

Molecular biology has provided classical fields such as embryology with powerful new tools, but it has not brought any confirmation to the Darwinian theory of evolution. Therefore, many biologists have quietly turned away from this simplistic view of life.

COMMENTARY is to be congratulated for inviting David Berlinski to present the most recent scientific argument against neo-Darwinism. In so doing it gives voice to a growing silent minority. This article will have a considerable impact.

Academy of Sciences
Paris, France

David Berlinski

SOME READERS seem to have been persuaded that in criticizing the Darwinian theory of evolution, I intended to uphold a doctrine of creationism. This is a mistake, supported by nothing that I have written.

Confronted with a complex human artifact like a watch, William Paley inquired into the source of its complexity. Insofar as such a complex object is unlikely, Paley reasoned, its existence can be explained only in terms of a human act, one in which material objects (gears, springs, levers) are deliberately arranged in a particular configuration. The same pattern of observation and inference, Paley went on to argue, indicates that complex biological structures are likewise the products of a deliberate act of design, the designer in such cases being the Christian deity.

Darwinian theorists accept the first of Paley's inferences, but reject the second. Biological artifacts are complex, they say, but not designed. Their existence may be explained in terms of random variation and natural selection. I dispute this claim, without endorsing Paley's theological inference. It is not necessary to choose between doctrines. The rational alternative to Darwin's theory is intelligent uncertainty.

A number of letters raise similar points; I have distributed my comments over a number of responses.

IN MAINTAINING that evolution is a process that has not been observed, H. ALLEN ORR writes, I appear to have overlooked examples of evolution like the speckled moth, which undergoes mimetic changes in wing coloration as the result of environmental pollution, or the development of antibiotic resistance in bacteria. Mr. Orr is correct that there are such examples; I scruple only at the conclusions he draws from them. Changes in wing color and the development of drug resistance are intraspecies events. The speckled moth, after all, does not develop antlers or acquire webbed feet, and bacteria remain bacteria, even when drug-resistant. The most ardent creationists now accept micro-evolution as genuinely Darwinian events. They had better: such are the facts. But the grand evolutionary progressions, such as the transformation of a fish into a man, are examples of *macro*-evolution. They remain out of reach, accessible only at the end of an inferential trail.

In calling attention to "species [that] have even been recreated from their ancestors in the lab," Mr. Orr is, no doubt, referring to the recent work of L.H. Rieseberg and his co-workers ("Role of Gene Interaction in Hybrid Speciation: Evidence from Ancient and Experimental Hybrids," *Science* 272, 1996). The example is pertinent to my critique. Rieseberg and his co-authors reproduced under artificial conditions the genetic changes that have historically led from *H. annus* and *H. petiolaris* to *H. anomalus*. The plants in question are sunflowers. What is remarkable is the extent to which this experiment contravenes Darwinian doctrine. Given the crucial role played by random events in evolutionary theory, many biologists have drawn the conclusion that the tape of life, if rewound, would produce "a different array of evolutionary end products" (Stephen Jay Gould, *Wonderful Life*). The number of crossing schemes notwithstanding, the tape in this experiment ran to precisely the same genetic end product each time it was played.

Mr. Orr contends that in my discussion of the role played by randomness in formal systems, I appear to be upholding an analogy at the expense of the facts. Random events, he writes, *do* occur in molecular biological systems; so much the worse, then, for my analogy. But the interpretation of molecular biological facts in formal terms is hardly a matter of analogy. It is molecular biologists themselves who have found unavoidable the language of codes and codons, information, algorithms, organization, complexity, entropy, and the like. There is little by way of analogy in all this. DNA is not *like* a code; it *is* a code. It follows, then, that circumstances known to degrade meaning or information in formal systems should be the source of alarm in the context of theoretical biology.

No one denies that random events take place within molecular biological systems. The relevant question is how. In a formal context, the matter is not a mystery. Codes may be designed to remain robust in the face of background noise; what is required is redundancy, and the genetic code is, in point of fact, highly redundant. In communication systems, redundancy appears as a matter of design. It does not arise spontaneously. In the case of the genetic code, according to one commentator, "strong selection pressures" created the requisite redundancy. But this is to dispel one mystery by promoting another, as the familiar Darwinian circle again makes its appearance, the tail of one concept lodged firmly in the mouth of another. I will return to this point in a number of other responses, but let me repeat what I stressed in my

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essay, that I am not advancing an argument on this issue, only expressing intellectual unease.

In inserting a Head Monkey into Richard Dawkins's thought experiment, my aim was to show how the mechanism of design, purged on one level of Darwinian analysis, makes a stealthy reappearance at another. Mr. Orr is unpersuaded. "The monkey analogy," he believes, "shows that by saving favorable random changes, evolution can gradually build fancy structures." Such indeed is the perennial hope of Darwinian theorists, but Mr. Orr has, I believe, underestimated the force of my criticism. Favorable changes are one thing; changes that *will* be favorable, another. If the mechanism of Darwinian evolution is restricted to changes that are favorable at the time they are selected, I see no reason to suppose that it could produce any fancy structures whatsoever. If the mechanism is permitted to incorporate changes that are neutral at the time of selection, but that will be favorable some time in the future, I see no reason to consider the process Darwinian.

This is hardly a matter of semantics. A system conserving certain features in view of their future usefulness has access to information denied a Darwinian system; it functions by means of alien concepts. But this is precisely how Dawkins's experiment proceeds. My estimable Head Monkey conserves certain alphabetic changes because he *knows* where the experiment is going. This is forbidden knowledge; the Darwinian mechanism is blind, a point often stressed by Darwinian theorists themselves (see George C. Williams, *Natural Selection*, 1992). I develop this in more detail in responding to Randy M. Wadkins.

In his final argument, Mr. Orr repeats what is certainly the current orthodoxy, namely, that evolution has no targets and so like the rest of us is not going anywhere at all: "The only thing that 'guides' evolution is sheer, cold demographics." Although this is not a point I discuss in my essay, I remain unconvinced. There are certainly long-term trajectories visible in the progression of life. The development of neurological complexity is the obvious example.

RICHARD DAWKINS has succumbed to the endearing weakness of revising the history of an unpleasant encounter in one's own favor. I have done as much myself. But a public charge calls for a public response. In 1992, Mr. Dawkins, John Maynard Smith, and I did share a podium at Oxford University. His hands trembling with indignation, Mr. Dawkins proposed to attack organized religion; I proposed to attack Richard Dawkins; and John Maynard Smith, seeing that it was required, proposed to defend Mr. Dawkins from my attack. The intellectual drubbing that Mr. Dawkins imagines I received, I recall in distinctly different terms. But why argue over the past? I have a videotape of our encounter, which I would be happy to make publicly available. If he wishes to debate again, Mr. Dawkins need only set the time and the place.

In remarks that have by now become well known, Jacques Mo-nod observed with some sorrow that under Darwin's theory, it is chance that plays the crucial role in the emergence and evolution of life. Mr. Dawkins proposes to deny this. His views and those of Monod are in conflict, a point clear to anyone able to read the English language. Mr. Dawkins's continuing insistence that two contradictory propositions are mutually consistent is evidence of an alarming logical deficiency.

In fact, Mr. Dawkins has simply misunderstood the fundamental character of the theory to which he has committed his passionate

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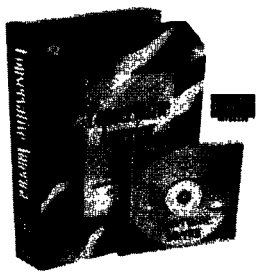

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defense. Darwin's theory *is* both random *and* deterministic. True enough. Mutations occur randomly, but once they have occurred, natural selection acts deterministically to cull the successes and discard the failures. By and large, true again. Nonetheless, Darwin's theory is *essentially* stochastic, a term which in statistics refers to a process involving a random sequence of observations.

Let me call a random mutation together with its deterministic consequences an evolutionary *episode*. The proto-tiger develops claws; he lives to mate successfully. Such is a single evolutionary episode. According to Darwin's theory, evolutionary episodes are independent. A snapshot of any given episode does not suffice to determine the character of future episodes. And for obvious reasons: future events are contingent on further random events. It follows that the episodes must themselves be represented by what probability theorists (and everyone else) call a random variable. And processes represented by a random variable are by definition stochastic. These facts are understood by anyone in possession of the requisite technical concepts. For all his flaws as a philosopher, Monod was quite clear about the character of Darwin's theory.

On one important matter, Mr. Dawkins's letter requires a word of reproof. At our debate, I was asked by a member of the audience whether I held to any creationist beliefs or doctrines. I replied unequivocally that I did not. My views of Darwinism, I said, were negative, but rational. On the videotape, as I utter these forthright words, Richard Dawkins may be seen sitting placidly on the podium, staring somberly into space.

DANIEL C. DENNETT is under the curious impression that the best rejoinder to criticism is a robust display of personal vulgarity. Nothing in his letter merits a response.

Still, one general point deserves attention. Both Daniel Dennett and Richard Dawkins have fashioned their reputations as defenders of a Darwinian orthodoxy. Their letters convey the impression of men who expect never to encounter criticism and are unprepared to deal with it. This strikes me as a deeply unhealthy state of affairs. Ordinary men and women are suspicious of Darwin's theory; Dennett and Dawkins hardly go far here in persuading them that their intellectual anxieties are in any way misplaced.

CONTRARY TO what ARTHUR M. SHAPIRO asserts I do not doubt that evolutionary biologists are contentious; I said as much in my essay. What I deplored was their tendency to conceal their differences from the public. This is another matter entirely.

Evolutionary biologists have a habit of ignoring the most pertinent criticisms of their theory until they can decently call them out-of-date. My references to papers by M.P. Schützenberger and Murray Eden not surprisingly prompt Mr. Shapiro to the conclusion that my arguments are anachronistic. In fact, Schützenberger and Eden enter my essay unobtrusively in largely a stage-setting role—Schützenberger to call attention to a conceptual problem at the very heart of evolutionary theory and Eden to offer, for the first time, a quantitative assessment of the space within which evolutionary searches must be undertaken. Their papers are historically important, the points they make no longer controversial.

Does Mr. Shapiro doubt that randomness introduces an alien and discordant note into the dynamics by which very complex objects change? Or that combinatorial inflation blows up the space of possible proteins? These themes have been pursued in countless papers, monographs, and books. Thus, Hubert Yockey, arguing that the discovery by chance of a single molecule of iso-1-cytochrome *c* requires a miracle, continues the line initiated by Schützenberger and Eden (Hubert Yockey, *Information Theory and Molecular Biology*, 1992. But see also Gregory J. Chaitin, "Toward a Mathematical Definition of 'Life,'" in *The Maximum Entropy Formalism*, eds. R.D. Levine and M. Tribus, 1979; Francis Crick, *Life Itself, Its Origin and Nature*, 1981; Max Delbrück, *Mind from Matter?*, 1986; Robert Shapiro, *Origins: A Skeptic's Guide to the Creation of Life on Earth*, 1986). The language of choice has changed—a fragile consensus is emerging that Kolmogorov complexity is a natural measure of biological complexity or specificity*—but the problems remain the same. The space of possible objects is entirely too large to be successfully searched by random means, a theme pursued yet again in Michael Denton's *Evolution: A Theory in Crisis* (1986).

I agree that much has happened in biology over the past 30 years—who could doubt it? Developments taking place within molecular genetics, molecular biology, and biochemistry *do* seem to me to be profoundly at odds with the Darwinian paradigm, and those within paleontology flamboyantly so. I mentioned some points of conflict in my essay; I refer to others here.

Consider, for example, the question of how an undifferentiated cell manages the task of specialization, becoming over the course of time a neuron or a muscle cell or any other particular and peculiar biological object. The requisite information is contained, of course, within the cell's genetic apparatus; the problem is one of specificity. What regulates the expression of some parts of that apparatus, while simultaneously suppressing the expression of other parts? One suggestion of long standing is that regulatory mechanisms are switched on and off by means of biochemical signals sent from neighboring cells.

It is this suggestion that experi-

* I discuss Kolmogorov complexity in an earlier essay, "The Soul of Man under Physics," COMMENTARY, January 1996.

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ments conducted by Chiou-Hwa Yuh and Eric Davidson seem to support (C.-H. Yuh and E.H. Davidson, "Modular *cis*-regulatory Organization of Endo 16, a Gut-specific Gene of the Sea Urchin Embryo," *Development* 122, 1996). A gene in the sea urchin *Strongylocentrotus purpuratus* contains over 30 binding sites for more than 13 regulatory factors. These regulatory factors turn parts of the genetic apparatus on and off. They are sensitive to signals from adjacent cells, and, what is more, they are clustered in discrete modules; different module combinations lead to different patterns of cellular development.

The system that results is one of extraordinary combinatorial intricacy and complexity. What of randomness in all this? We have no idea how the general mechanism for cell-specific transcription came into existence; to argue otherwise would be sheer dogmatism. But one might have thought that a system of such delicacy, once it came into existence, would be unusually sensitive to random perturbations. Not so. The regulatory apparatus seems designed to incorporate mutations. Certain sites within each module function as key switches, turning the module on or off; mutations have a specific, but highly discrete effect. Modules are largely independent, functioning as more or less complete sets of instructions, like blocks of code. As one commentator puts it, the transposition of *cis*-regulatory modules from one gene to the next "may be a convenient way for nature to develop novel patterns of development" (Wade Roush, *Science* 272, 1996).

As is so often the case in molecular genetics, the description of a specific biological system reveals a pattern at odds with the one demanded by Darwinian theory. Differentiation is a highly sophisticated, enormously complex, and stable process, one in which the system is protected from noise by its very design. Mutations play a role in developmental change, but not a driving role. Rather, the facts suggest a system in which there are a finite number of combinatorial possibilities, with mutations serving to initiate certain carefully stage-managed sequences. The possibilities for module combination are fixed from the first; random changes serve simply to throw the various switches.

Examples of this sort could be multiplied at length; as our knowledge increases, the crude Darwinian scheme seems progressively remote from the evidence. How, for example, to account for the astonishing fact that from the point of view of the informational macromolecules, human beings and chimpanzees are virtually identical, their sequences in alignment to 99 percent (M.C. King and A.C. Wilson, "Evolution at Two Levels in Humans and Chimpanzees," *Science* 188, 1975)? The remaining slight difference evidently has controlled the development of a bipedal gait, with the profound neurological changes that this requires; the fully formed hand; the formation of the organs of speech and articulation; and, of course, the elaboration of the human mind, an organ unlike anything else found in the animal kingdom. Nothing in this suggests even remotely a continuous accretion of small changes. The evolutionary promotion of our ancestors seems to have been under the control of powerful *regulatory* genes, instructional blocks capable of coordinating a wide variety of novel functions. We simply have no idea how any of this works.

Still, the real infirmities of Darwin's theory are conceptual and not empirical. By the standards of the serious sciences, Darwin's theory of evolution remains little more than a collection of anecdotal remarks. Criticism is often a matter of clarification. Thus, making a point unrelated to the evidence, I argued that Darwinian theory is logically troubled. When I maintain that both Messrs. Dennett and Dawkins introduce by means of the backdoor the element of design they have ostentatiously booted from the front, my criticisms are again intended to show that the theory is deficient if only because it fails to meet its *own* standards for success.

The redback spider gives Mr. Shapiro pause; my request that its dining habits be deduced from first principles—from any principles at all—strikes him as disingenuous. "The chain of causes," he remarks, is simply too long to be mastered by anyone other than an omniscient deity. I do not for a moment doubt that that is so, but precisely this circumstance prompts the request for scientific theory in the first place. The chain of causes is *everywhere* too long to be explored and then mastered; it is the purpose of a theory to abbreviate and compress the data. Imagine a biologist who, on the grounds that the chain of causes is too long, failed to explain the fact that while men develop arms, geese develop wings!

The fact that the redback spider commits sexual suicide is interesting; one wishes to know why it is so. In this, and in countless similar cases, evolutionary theory simply has no explanation. What good is it, then?

Finally, I am astonished that Mr. Shapiro should think to object to Romer's *Vertebrate Paleontology* as a reference. The subject at hand is not particle physics; the main lines of vertebrate development have been clear for more than a century. My aim in suggesting Romer was to point the reader toward his stratigraphic charts: these plot vertebrate groups against time, the very many dotted lines between groups indicating purely hypothetical phylogenetic relationships.

PAUL R. GROSS is anxious lest in criticizing Darwinian theory I give comfort to creationists. It is a common concern among biologists, but one, I must confess, to which I am indifferent. I do not believe biologists should be in the business of protecting the rest of us from intellectual danger.

I did not say in my essay that the fossil record contains no intermedi-

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ate forms; that is a silly claim. What I did say was that there are gaps in the fossil graveyard, places where there should be intermediate forms but where there is nothing whatsoever instead. No paleontologist writing in English (R. Carroll, *Vertebrate Paleontology and Evolution*, 1988), French (J. Chaline, "*Modalités, rythmes, mécanismes de l'évolution biologique: gradualisme phyletique ou équilibres ponctués?*," reprinted in *Editions du* CNRS, 1983), or German (V. Fahlbusch, "*Makroevolution, Punktualismus*," in *Palaontologie* 57, 1983), denies that this is so. It is simply a fact. Darwin's theory and the fossil record are in conflict. There may be excellent reasons for the conflict; it may in time be exposed as an artifact. But nothing is to be gained by suggesting that what is a fact in plain sight is nothing of the sort.

I do not doubt that Stephen Jay Gould and Niles Eldredge are convinced of the "essential truth of organic evolution"; or that they believe natural selection to be "at least one mechanism of it." The difficulty with this observation is that it is compromised by its qualifications. At any given moment, if the phases of the moon happened to be right, I might align myself with Mr. Gross's essential truth of organic evolution; as for natural selection, nothing at all remains at issue if it is demoted from its central position in Darwin's theory. The idea that evolution proceeds by means of many different forces is both unanswerable and uninteresting. To his credit, this is something Richard Dawkins recognizes.

It may well be true that my concerns for the logical niceties of Darwinian theory are out of date, as Mr. Gross suggests. So much the worse for evolutionary biology. To those of us on the outside, Darwin's theory will continue to seem seriously infected by conceptual circularity. (In *Concepts and Methods in Evolutionary Biology*, the philosopher Robert Brandon begins by at least recognizing the problem.)

The pattern of self-deception that I mocked in my essay is on display in any number of publications. In the first chapter of *The Causes of Molecular Evolution* (1991), John H. Gillespie is concerned to determine why a certain kinetic parameter (the Michaelis constant, K_m) reaches intermediate values in a certain class of fish, the ectotherms. "If natural selection is responsible for the evolution of K_m," Gillespie writes, "we should be able to understand why it would be maladaptive to exhibit values that are much less or much greater than the intermediate value." In fact, the two biochemical explanations Gillespie considers are flatly in conflict. They cannot both be true, although both may be false. To Gillespie, though, it hardly matters. ". . . [A]t this point in our discussion," he writes, "it is important merely to accept that there are plausible reasons for K_m to be evolutionarily adjusted to intermediate values. This forms the theoretical basis of our acceptance of the conservation of K_m in ectotherms as *evidence* for the action of natural selection in response to different thermal environments" (emphasis added). If the discussion has proceeded beyond the observation that K_m reaches intermediate values in ectotherms, the fact is not discernible by me.

On the matter of the eye, Mr. Gross has misunderstood me. I did not propose to champion Stephen Jay Gould's question, "What good is 5 percent of an eye?" Instead, I argued that the question is hopelessly premature. Without knowing *how* the visual system works, we cannot determine *whether* it is accessible to a Darwinian mechanism. This seems to me an incontrovertible point, if also one that in my experience evolutionary biologists indignantly deny.

Let me offer an analogy. Starting from one and adding by two's, I cannot hope to reach the number eighteen. So far, so good. Starting from one and adding by two's, can I hope to reach the number n, where n is some number or other? Who knows? The question is underdetermined. Starting from *some* principle of addition or other, could I expect to reach *some* number or other? The question is now doubly underdetermined, functioning as a single equation in two unknowns. So, too, the question of whether a Darwinian mechanism with unspecified properties could reach a mammalian visual system whose properties are not yet completely understood. It is only credulous philosophers who imagine that a Darwinian mechanism is universally competent.

I am in agreement with Mr. Gross when he refers to "new and astonishing evidence" about the origin of the eye. Herewith the facts. Halder, Callaerts, and Gehring's research group in Switzerland discovered that the *ey* gene in *Drosophila* is virtually identical to the genes controlling the development of the eye in mice and men. The doctrine of convergent evolution, long a Darwinian staple, may now be observed receding into the darkness. The same group's more recent paper, "Induction of Ectopic Eyes by Targeted Expression of the Eyeless Gene in *Drosophila*" (*Science* 167, 1988) is among the most remarkable in the history of biology, demonstrating as it does that the *ey* gene is related closely to the equivalent eye gene in Sea squirts (Ascidians), Cephalopods, and Nemerteans. This strongly suggests (the inference is almost irresistible) that *ey* function is universal (universal!) among multicellular organisms, the basic design of the eye having been their common property for over a half-billion years. The *ey* gene clearly is a master control mechanism, one capable of giving general instructions to very different organisms.

No one in possession of these facts can imagine that they *support* the Darwinian theory. How could the mechanism of random variation and natural selection have produced an instrument capable of

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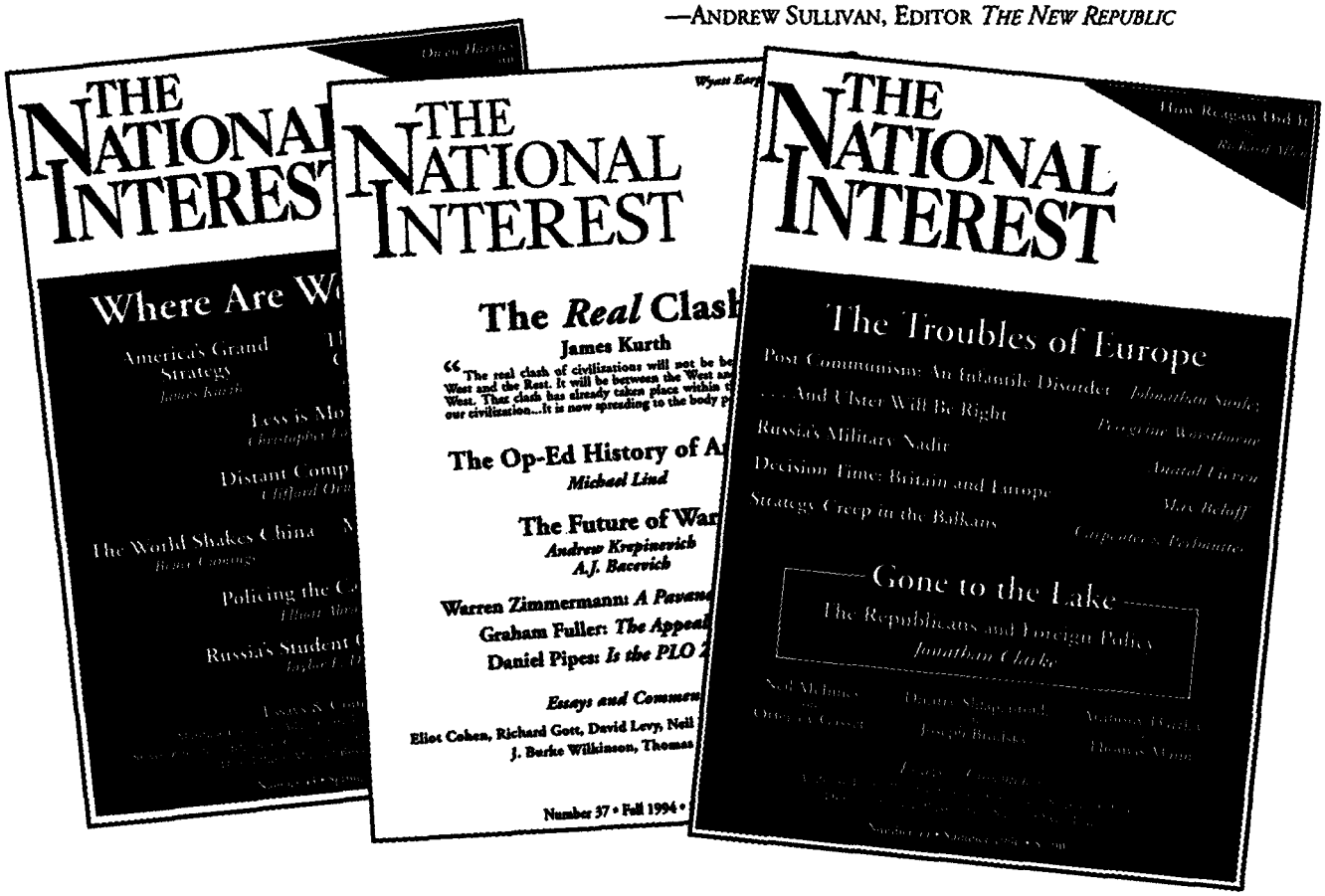

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anticipating the course of morphological development and controlling its expression in widely different organisms?

I deny that I have in any way misrepresented Jacques Monod's arguments; his words are clear and unequivocal, in English and in the original French. If the word "chance" has an idiosyncratic use among evolutionary biologists, the secret has been closely kept. As far as I can determine, evolutionary theorists make use of the same technical concepts as the rest of the mathematical community, a point evident in any current text—*Mathematical Evolutionary Theory*, ed. R. Feldman (1989), for example.

The notion of a *bauplan* (*der Bauplan*, *die Baupläne*), or body plan, has had some currency in the English-speaking world; Stephen Jay Gould and Richard Lewontin use the term and so does J.W. Valentine. But it is in general dismissed as a concept by Darwinians—George C. Williams, for example. The idea of a body plan gained currency in the work of the great turn-of-the-century embryologists (Dreisch, Child, Boveri, Spemann), and before that in the writings of pre-Darwinian French biologists (Saint-Hilaire, Cuvier, Serres). I cannot imagine why Mr. Gross thinks it a term I have misused. (For reasons that are obscure to me, both he and Daniel Dennett carelessly assume that they are in a position to instruct me on a point of usage in German, my first language.)

I do not for a moment suppose, nor have I ever written, that biologists are in *conspiracy* "to hide from outsiders the bankruptcy of the central principle of biology." For one thing, the theory of evolution is hardly the central principle of contemporary biology. That description must surely be reserved for the thesis that all of life is to be understood in terms of the "coordinative interaction of large and small molecules" (James Watson, *The Molecular Biology of the Gene*). Rather, the theory of evolution functions as biology's reigning ideology. And no conspiracy is required to explain the attachment of biologists to a doctrine they find sustaining; all that is required is Freud's reminder that those in the grip of an illusion never recognize their affliction.

WHAT RANDY M. WADKINS affirms about the pre-Cambrian era is true enough (but see E.H. Davidson, K. Peterson, and R. Cameron, "Origin of Bilaterian Body Plans: Evolution of Developmental Regulatory Mechanism" *Science* 270, 1995) for a real sense of the inadequacy of our grasp of fundamental facts concerning the Cambrian explosion). I only wonder why he imagines that his observations are in conflict with anything I have written.

In the same spirit, Mr. Wadkins calls me to task for failing to cite "the specific cases where transitional fossil forms are found in abundance." The fossil record does contain many intermediate forms; a recent publication on the Internet (Kathleen Hunt, *Transitional Vertebrate Fossils*, FAQ [Frequently Asked Questions], jespah@u.washington.edu) lists more than 250. But Mr. Wadkins has misunderstood the nature of the argument. My concern was to state the obvious: the fossil record contains gaps, places where the continuity assumptions of Darwinian theory break down. That there are places where the gaps are filled is interesting, but irrelevant. It is the gaps that are crucial.

Classical physics suggests that the spectral distribution of intensity in black-body radiation should be a continuous function of temperature. Experiments conducted at the end of the 19th century indicated otherwise. Continuity is an essential aspect of classical mechanics, impossible to discard without discarding the entire theory. Since the anomaly of black-body radiation could not be understood within classical mechanics, physicists sensitive to the evidence were persuaded to attach their allegiance to the new quantum theory.

The classical Darwinian theory of random variation and natural selection requires a continuous distribution of animal forms, one that must be reflected in the fossil record. The assumption of continuity is a crucial aspect of Darwinian theory; it cannot be carelessly discarded. This again is something that Richard Dawkins has rightly emphasized. The fossil record does not appear to support the assumption of evolutionary continuity, or anything much like it. Why is it that evolutionary biology is immune to evidence of the sort that falsified classical physics?

It is upon the horse that Mr. Wadkins pins his best hopes: its evolution, he suggests, comprises an unassailable sequence, one bright bursting beast after the other. To a certain extent, however, the neat evolutionary progression from *Eohippus* to *Equus* is an artifact of selection. The original groupings of species are far thicker (or bushier, to use the term of choice) than first thought, so that the sequence depends on a judicious selection of horse-like organisms at each stage of development. It is rather as if one were to explain the emergence of the word *cat* by selecting the "c" from cattle, the "a" from abattoir and the "t" from tattle. Although almost 50 years old, G. G. Simpson's discussion in *The Major Features of Evolution* still repays study; for the modern point of view there is B.J. MacFadden, "Horses, the Fossil Record, and Evolution: A Current Perspective" (*Evolutionary Biology* 22, 1988).

But setting these reservations aside, what follows if the *Equus* sequence is accepted as a Darwinian progression? Very little. There are no more than three or four evolutionary sequences that, under the best of circumstances, suggest a complete progression of forms. By contrast, there are thousands upon

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thousands of species whose significant morphological features are not explained by complete or even highly suggestive sequences. Are the existing evolutionary sequences representative, or anomalous? In view of the striking discontinuities in the fossil record, I urge that they are anomalous; it would be interesting to know why Mr. Wadkins demurs.

When I observed that Richard Dawkins was unable to write a computer program that simulated his linguistic thought experiment, I did not mean that the task at hand was difficult. It is impossible. Mr. Wadkins commends the discussion in Keen and Spain's *Computer Simulation in Biology* as a counterexample; it is no such thing. What Keen and Spain have done is transcribe Dawkins's blunder into the computer language Basic. Here are the steps they undertake. A target sentence is selected—BASIC BIOLOGICAL MODELING IS FUN. The computer is given a randomly derived set of letters. The letters are scrambled. At each iteration, the computer (or the programmer) compares the randomly derived sequence with the target phrase. If the arrays—sequences on the one hand, target phrase on the other—do not match, the experiment continues; if they do, it stops.

There is nothing in this that is not also in Dawkins, the fog spreading from one book to the next. The experiment that Keen and Spain conduct is successful inasmuch as the computer reaches its target; but unsuccessful as a defense of Darwinian evolution. In looking to its target and comparing distances, the computer is appealing to information a biological system could not possess.

This point seems to be less straightforward than I imagined, so let me spell out the mistake. Starting from a random string, suppose the computer generates the sequence BNDIT DISNE SOT SODISWN TOSWXMSPW SSO. Comparing the sequence with its target, it proposes to conserve the initial "B." But why? The string is gibberish. Plainly, the conservation of vagrant successes has been undertaken with the computer's eye fixed firmly on its future target, intermediates selected not for what they are (gibberish, after all), but for what they *will* be (an English sentence). This is a violation of the rule against deferred success. Without the rule, there is nothing remotely like Darwinian evolution. What the computer has in fact done is to match randomly selected items to a template, thus inevitably reintroducing the element of deliberate design that was banished from the Darwinian world.

KARL F. WESSEL believes that Marshall Horwitz and Lawrence Loeb have provided an experimental refutation of my main argument. He has misunderstood both their argument and mine. In "Promoters Selected from Random DNA Sequences" (*Proceedings of the National Academy of Science*, October 1986), Horwitz and Loeb reported that by substituting randomly derived DNA sequences for original promoters in certain bacterial plasmids, they were able to discover additional promoters that maintained or enhanced drug resistance. Promoter sequences, I should say, are not highly active; their function is to be bound by the proteins of the transcription complex. What is more, base pair sequences in promoters are very often low in specificity: only a few base pairs are crucial to the promoter's function.

What Horwitz and Loeb were after may be understood by a linguistic analogy. Consider an English sentence: THE CAT SLEEPS ON THE MAT. Suppose one wished to discover which words might be substituted for the word "cat" while still preserving either the sense of the original sentence or a sense close to the original. One method might be to combine English letters at random to form three-letter words (rat, tar, aim, tic, etc.), the words inserted in turn into the original sentence. Sentences in which meaning is preserved would be counted as successes. But such an experiment—similar in fact to experiments used in linguistics—would be a device for generating substitution classes, *not* a demonstration that meaning is preserved under arbitrary substitutions. Ditto the experiment reported by Horwitz and Loeb.

In addition to missing the point of the experiment, Mr. Wessel conveys an erroneous impression of its quantitative structure. "Of the approximately 10^{11} possible sequences of this type," he writes, referring to the total number of possible sequence substitutions, "it turns out that many promoted the function of the deleted natural sequence. . . ." In fact, Horwitz and Loeb report that ". . . very roughly, 2 percent of the 3×10^{11} possible recognition sequences present in this construction may duplicate promoter recognition site activity." This, of course, is a statistical estimate, one based on a small sample. In the case of plasmids deficient in adenine, the relevant number of successes drops to 0.2 percent. The vast majority of random sequences thus *failed* to duplicate promoter recognition site activity.

Citing with satisfaction the work of John Koza ("Genetic Programming: A Paradigm for Genetically Breeding Populations of Computer Programs to Solve Problems," Technical Report STAN-CS-90-1314, Department of Computer Science, Stanford University), Mr. Wessel would argue that genetic algorithms embody the abstract properties of robustness in the face of randomness that I claim could not be a feature of living systems. In fact, I made no such claim. As their name suggests, genetic algorithms are structures designed to incorporate (or mimic) certain biological operations. Typically, strings or sets of strings are introduced as fundamental data structures and manipulated by operators that reproduce the effects of random variation, genetic crossing, and natural selection. Work in this area was initiated in the 1970's by John Holland in

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Mr. Wessel's claim that "[m]any of these evolved programs perform their optimizing tasks better than the best intentionally designed ones" is surely not incontrovertible; some computer groups argue that genetic algorithms do not outperform hill-climbing algorithms (*Proceedings of the Second International Conference on Genetic Algorithms and Their Applications*, ed. J.J. Grefenstette, 1987). But let that pass. I do not for a moment deny the possibility that a controlled random search might be an effective way in which to explore a large space. In referring to the Face Print algorithm in my essay, I said as much. What is at issue is the nature of the controls. The Face Print algorithm may be a fine method for prompting a crime victim's memory; it may, in fact, be far superior to traditional methods in which the victim offers a police artist a description of the malefactor (*Uh, let me see, big nose, yes, it was a big nose, I think, but no, not that big . . .*); but the algorithm fails to capture an essential feature of a Darwinian mechanism, for fitness is evaluated in terms of an ever-progressing match between what the algorithm produces and what the crime victim remembers, with the crime victim's memory functioning as—once again—a forbidden design or template.

The larger question posed by genetic algorithms is whether they can reach any interesting lifelike structures. Although genetic algorithms are new, they make use of an old mathematical concept, a Markov chain. It is worth noting that mathematical models based on Markov chains cannot in principle generate the sentences of a natural language. This is something known since the 1950's; I offer it as an observation.

In speaking of redundancy, Mr. Wessel has appeared to misunderstand the basic technical facts. There are two theories loitering in the background. One is Shannon's theory of information, which was developed in the 1940's (see A.I. Khinchin, *Mathematical Foundations of Information Theory*); the other is the Kolmogorov-Chaitin theory of algorithmic complexity, which was developed in the 1960's and 1970's (see G. Chaitin, "Information-theoretic Computational Complexity," in *IEEE Transactions on Information Theory*, IT-20, 1974).

Information theory makes use of concepts drawn from the classical theory of probability; the theory of algorithmic complexity does not. When Mr. Wessel speaks of "maximally compressed programs, in the sense of algorithmic information theory," he is incoherently attributing to one theory the concepts of another. Code compression is an information-theoretic concept, not a concept of algorithmic information theory at all. What information theory reveals is that in order to determine the best code compression for a given text, all that need be considered is the entropy of the text—the information it contains—and the number of its symbols. The maximally compressed codes are, indeed, rare, but only because they are maximally compressed. (The fact that they are rare follows from the fundamental Shannon-Macmillan theorem, but it follows trivially.) Contrary to what Mr. Wessel imagines, the genetic code is "optimal," a fact demonstrated by Cullmann and La-bouygues ("*Le Code génétique, instantané et absolument optimal*," *Compte rendue* 301, 1985).

Redundancy, too, is an information-theoretic concept. Natural languages are redundant by virtue of their structure and their error-correcting mechanisms; the informational macromolecules are redundant by virtue of their structure and error-correcting mechanisms. This accounts for their stability. The problem at hand, however, is not to explain why the informational macromolecules have stayed the same, but how they might be generated by random means and how they might change by random mutations. Mutations used to be thick on the ground; now the beneficial ones are considered unlikely events. I am all for biological stability: I simply wonder, given all those stable macromolecules, that anything ever happens.

In addition to being redundant, the informational macromolecules are complex or highly specified. (*These* are terms drawn from the theory of algorithmic complexity and not from information theory.) Complexity is a form of *in*compressibility. A program, for example, is a linear string: so many bits of 1's and 0's. Complex linear strings are those that cannot be generated by strings shorter than themselves; the simple strings have some give. Thus, a string of randomly strung-out 0's and 1's cannot be generated by a shorter string; they are what they are, and in conveying their nature, I must convey the strings themselves. A string of 100 1's, on the other hand, may be generated by a string that simply specifies that 1 be written 100 times. Such strings are simple.

Far from being rare, as Mr. Wessel appears to claim, it is the complex strings that are in the majority. For example, of 1,000 sequences of a given length, typically only *one* may be compressed into a sequence shorter than itself. The informational macromolecules are thus buried in an enormous set of complex, utterly random sequences. It is very difficult to see how they might have been discovered by chance; and difficult again to see how chance might be the instrument of their change. In passing from the information macromolecules to complex biochemical *systems*—the Cori cycle, the mammalian immunodefense systems—the problems become infinitely more difficult.

I am unimpressed by computer models demonstrating punctuated equilibrium, whether elegantly or not. A typical problem in applied mathematics is to discover an equation that will describe a set of data points. A good deal depends on what the mathematician permits himself.

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As Enrico Fermi noted long ago, with five free parameters, an equation may be made to represent data points resembling an elephant. So, too, with computer models.

I AM taken with the analogy proposed by PHILIP H. SMITH, JR. between living creatures and human languages, if only for prophylactic reasons. Just as the striking properties of human language cannot, as far as we know, be derived from considerations of engineering or communications optimality, so it seems to me that many of the most striking properties of living systems will fail to reflect properties of adaptation or optimality.

But contrary to what Mr. Smith believes, I did not ask for predictive laws for biology, or laws comparable to those found in physics. I simply observed that evolutionary theories quite typically fail to answer any interesting questions, whether historically or not.

Mr. Smith's remonstrations on thermodynamics point to another misunderstanding. In writing that living creatures appear to offer at least a temporary rebuke to the second law of thermodynamics, my operative word was "appear." I am familiar with the scenario, standard from Boltzmann to Monod, according to which life represents a statistical fluctuation in the scheme of things. It was this scenario that I meant to evoke by writing that both the second law of thermodynamics *and* the theory of evolution explain things by an appeal to a turn of the same cosmic wheel—chance.

Still, I would not wish to overstate my agreement with the standard line. Living systems do constitute an open system, the sun affording them energy which they then degrade. But the sun shines alike on the living and the dead. And so the question inevitably returns to its old familiar haunts: how did living creatures acquire the mechanisms needed to exploit all that free energy? I have no idea; but then, neither does anyone else.

In general, the relationship between the principles of biology, if there are any, and the laws of physics seems to me wide open. There are, after all, three possibilities. Those principles may prove consistent with the laws of physics; inconsistent; or independent. We have no idea at present which version of events is true. I see no reason to assume that the problem will prove any simpler than the problem of establishing that the continuum hypothesis and the axiom of choice are independent of the axioms of set theory, an enterprise requiring for its resolution the genius of Kurt Gödel and Paul Cohen.

IF SHELDON F. GOTTLIEB really believes that creationist doctrines follow as natural inferences from any remark of mine, he needs to show how.

There is no widely accepted, remotely plausible scenario for the emergence of life on earth. The proteinoid hypothesis of Sidney Fox and his colleagues (S.W. Fox, "Molecular Evolution to the First Cells," *Pure and Applied Chemistry* 34, 1973) has not persuaded the biological community of its strength. Criticisms of it are overwhelming (W. Day, *Genesis on Planet Earth*; K, Dose, "Ordering Processes and the Evolution of the First Enzymes," in *Protein Structure and Evolution*, eds. J.L.Fox, Z. Deyl, A. Blazy, 1976; C.E. Folsome, "Synthetic Organic Microstructures and the Origin of Cellular Life," *Die Naturwissenschaften* 7, 1976; C. Ponnamperuma, "Cosmochemistry and the Origin of Life," in *Cosmochemistry and the Origin of Life*, ed. C. Ponnamperuma, 1983; and so forth).

In commenting on my discussion of the thorn bush and the Pitcher plant, Mr. Gottlieb topples straight

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into a trap I never dared imagine would lure a biologist. I know as well as anyone that once the facts are available, an evolutionary story may be concocted by which those facts may be explained. But if the geographical facts were reversed, does Mr. Gottlieb doubt that an imaginative biologist could provide an account of the Pitcher plant showing why it thrives in nutrient-*rich* soil? I am asking for the stories to follow from general principles *before* the facts are known.

When I asked who on the basis of experience would be inclined to disagree with the account of creation given in the Book of Genesis, my aim was rhetorical; but I stand by the question. Our experience is overwhelmingly in favor of the thesis that complex objects arise as the result of a deliberate act of design. It may well be that the thesis is false; but it is what experience *suggests*.

Mr. Gottlieb has come to the conclusion that in science it is rarely pertinent to ask *why*? Why are the equations of physics expressed as quadratic forms? Why is the orbital spectrum of the hydrogen atom discrete? Why does darkness fall so quickly in the tropics? Why does the earth not spiral into the sun? Why do women outlive men by seven years? Why do cat's eyes contain a nictitating membrane? And why did Sheldon Gottlieb not think more carefully before conveying himself into print?

ROBERT SHAPIRO has modestly withheld from readers the fact that he is the author of a penetrating work on pre-biotic evolution, which I have already cited: *Origins: A Skeptic's Guide to the Creation of Life on Earth*. As I might have hoped, Mr. Shapiro is with me for nine-tenths of my argument. He jumps ship at the thought that our options may have narrowed to a choice between Darwin and what he calls Intelligent Design. But, contrary to what Mr. Shapiro supposes, I entertain no supernatural explanations for the complexity of living systems. The thing is a mystery, and if there is never to be a naturalistic explanation, I shall forever be content to keep on calling it a mystery. The two of us might have gone on together to the end.

A skeptic about so much, Mr. Shapiro now feels compelled to commend theories of self-organization and complexity as solutions to the problems that vex us. For me, the papers, books, and monographs coming from the Santa Fe Institute, with which Stuart Kauffman is prominently identified, convey something familiar. I once spent a good deal of time demolishing the set of fashionable mathematical theories collected under the generic term of systems analysis (*On Systems Analysis: An Essay on the Limitations of Some Mathematical Methods in the Social, Political, and Biological Sciences*, MIT Press, 1976). Reading Kauffman's *The Origins of Order* (1993), I was flooded with memories. Had I time, I would go after Santa Fe with gusto; but soon the night comes, Dr. Johnson reminds us, wherein no man can work. I find nothing of value in various theories of self-organization; the very idea is to my mind incoherent; but I leave it to others to make the case.

IN MY essay, I endorsed Paley's inference *from* the complexity of a human artifact *to* the design, and hence the designer, that brought it into being. As a counterexample, PAUL H. RUBIN offers the neoclassical market, complex but not designed.

Let me draw a distinction between the institutional structure of a market and the behavior of its economic agents. Neoclassical economic theory suggests that even though there are very many agents in a given market, its overall properties may be explained on the basis of relatively simple economic assumptions. They come together, those agents, each to maximize his utility; there follows a process of *tâtonnement*, of feeling one's way, followed in turn by equilibrium. Such is the vision given expression, for example, by Léon Walras.

The intellectual structure of micro-economic theory is very similar to that of theories controlling the behavior of perfect gases in physics. But to the extent that simple laws prevail, there is no reason to describe this aspect of a market as complex.

The institutions of a market comprise the law of contracts, accounting practices, various regulatory bodies, longstanding traditions, and the like. And here Paley's original inference *does* come into play. Complex human institutions as well as complex human artifacts arise as the result of deliberate design. On the most general level, Paley's question—whence the origin of complexity?—draws a connection between complexity and intelligence, a connection preserved in the case of markets.

In *The Language Instinct* (1994), Steven Pinker has written an engaging book about Noam Chomsky's revolution in linguistics. Chomsky has from time to time expressed his impatience with Darwinian doctrine, and it is this Chomsky whom Pinker proposes to instruct. His argument is nothing more than a weak solution of Richard Dawkins. In fact, little in our understanding of language even hints at a Darwinian development. "Any progress toward" the goal of understanding the language system, Chomsky writes, "will deepen a problem for the biological sciences that is far from trivial: how can a system such as human language arise in the mind/brain, or for that matter in the organic world, in which one seems not to find anything like the basic properties of human language" (*The Minimalist Program*, 1995)?

As it has done to so many others, epistemology brings Mr. Rubin low. "All science," he writes, "is an attempt to explain systems we do not fully understand with processes we cannot completely specify." Who could doubt it? We pause, grope, stare in perplexity, pause,

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grope again. But Mr. Rubin has confused the facts of life with the conditions for knowledge. The rational answer to the question of whether a system we do not completely understand might be constructed by means of a process we cannot completely specify must be that we do not know. Let us have the details and we shall see. The bouncy assumption that every biological structure *must* be accessible to a Darwinian mechanism serves only further to empty Darwinian theory of its empirical content.

The new science of evolutionary biology, Mr. Rubin believes, has carried us to the threshold of "truly understanding" the source of the human mind. I see no evidence that this is so. What has that zestful new science told us about the origins of human language; the human ability to do mathematics and construct far-reaching scientific theories; human culture, with its attendant mysteries; human art, music, and poetry; the human sense of time, or those spiritual urges which baffle and torment us? Not much, I am afraid.

I WAS concerned in my essay to question the thesis that random variation and natural selection are the mechanisms by which the appearance, development, and organization of life on earth are to be explained. JOHN M. LEVY is concerned to defend what he calls an "evolutionary scenario"—descent with modification, as it happens. To a certain extent, his letter and my essay have passed each other like ships in the night.

There is a great deal of evidence in favor of descent with modification; the pattern is illustrated in a thousand different textbooks. And it is possible to accept descent with modification as an overall description of the spatial and temporal organization of living creatures without in any way agreeing that a Darwinian mechanism explains the pattern. Such seems to have been the position of the great French zoologist, Pierre Grassé (*L'Evolution du Vivant*).

Still, the evidence in favor of descent with modification is not without its troubles. *Hyman's Comparative Vertebrate Anatomy* (ed. Marvalee H. Wake), for example, offers a useful corrective to the idea that the facts of comparative anatomy are either straightforward or unequivocal. This magnificent discipline does make it overwhelmingly clear that chordate anatomical structures are in many cases similar; but the crucial issue is not whether such structures are similar but whether they are *homological*, in the sense that, of two given structures, one is ancestral to the other.

It does little good to say, as *Hyman* does, that "homology *means* intrinsic similarity that indicates a common evolutionary origin." If this is what homology means, there is little point in asking empirically what it signifies. Without a sharp criterion distinguishing analogical from homological structures, biologists have no way of determining that, say, the fusiform shape of the seal and the tuna is of no evolutionary significance.

The line separating analogical from homological structures has traditionally been drawn with respect to three features: (a) anatomical structure; (b) topographic relationships of anatomical structures to animal bodies; and (c) embryological development. As the criterion for homological relationships is clarified, many examples adduced in favor of the hypothesis of descent with modification become dubious. The vertebrate occipital arch and the vertebrate kidney provide well-known examples. There are many others.

In general, it remains true that while the anatomical facts are rarely in dispute, their interpretation remains both difficult and tentative. G. De Beer's *Homology: An Unsolved Problem*, still merits study, while Mark Ridley's *The Problem of Evolution* (1985) offers instructive evidence of the ease with which the matter of homology may be subordinated to an adroit verbal shuffle.

In objecting to my claim that the fossil record contains gaps, Mr. Levy would have me appreciate more robustly "the pieces of the fossil record that started turning up," especially in connection with the ungulate-to-whale transition. He is referring to *Abulocetus natans*, and he is correct in observing that this makes the hypothesis that aquatic mammals evolved from terrestrial mammals more plausible than it was. I am concerned only to ask whether the sequence is representative or anomalous—the same question I posed in my response to Randy Wadkins. In *Evolution: A Theory in Crisis*, Michael Denton questions the ungulate-to-whale transition from a different perspective.

UNLIKE MARTIN GARDNER, I do believe that punctuated equilibrium damages the Darwinian viewpoint; so does everyone else. By compressing the time available for speciation, Stephen Jay Gould has eliminated an accretion of small changes as its mechanism. The result is a theory which very nicely fits the facts, but a theory that all the same leaves the mechanism of change entirely in the dark.

As for Mr. Gardner's last question: for many years I have been puzzling over whether the first humans had parents; sad to say, I still have no answer.

FINDING NO convenient point of affirmation in my essay, HERBERT GINTIS wishes to know what I am trying to say. I never deny the facts of evolution, he remarks, apparently with some vexation. And it is true, I never do, if only because evolution has come to cover *any* process of biological change explicable in naturalistic terms. As for natural selection, I do not deny that it occurs, either, insofar as it is occupied in establishing that what survives, survives. (There is no denying the inescapable.) But denials being

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called for, I do deny that *theories* of random mutation and natural selection explain much about the emergence or development of life on earth. Mr. Gintis seems to feel that such denials are intellectually impossible. Evidently not.

DAVID P. BABCOCK is correct at least in this: when it comes to the major problems of biology, I have nothing better to offer than the theories I dismiss. The pugilistic wisdom that you can't beat something with nothing seems to have become a staple of the philosophy of science; it now functions as a reactionary force, making it difficult to bang away at deficient or defective theories. This is surely an unhappy state of affairs. I am not a biologist and so have no theory to offer in place of the one I criticize. But neither am I a chef. On being presented an oversalted dish, should I refrain from upbraiding the cook because I cannot prepare anything better?

I AM happy to salute *Archaeopteryx*, recognizing the little monster as half-bird and half-reptile (or anything EUGENIE C. SCOTT wishes).

Strawmen? As long as I am at it, let me knock down a few more. There is no "Cambrian-explosion argument"; there is the fact that an explosion of biological forms took place in the Cambrian era. Far from being impossible, amino acids come together to form proteins all the time; no one has provided a plausible account of the *origin* of the informational macromolecules. And there is no need to explain the difference between evolution and chance to any native speaker of English: the words mean different things.

I ENDORSE EDWARD T. OAKES's endorsement of Gertrude Himmelfarb, but find myself unable to appreciate his counsel when the discussion passes from history to the philosophy of science. Like David Babcock, Father Oakes wishes that I would exchange a bad theory for a better one. The wish betrays a confusion of genres; my business is criticism and not biological theory-making. But may I voice my unhappiness with the formulation of the request itself? In asking for the engine of evolution, Father Oakes has already determined the form an answer must take. There is evolution, on the one hand, and a dynamic theory, on the other. This is entirely too narrow a vision.

Like a number of other writers, Father Oakes believes that the gravamen of my essay lies with the failure of Darwin's theory successfully to predict the future. Not so. I ask only that evolutionary explanations follow from general principles.

RESPONDING TO KENT GORDIS, I find myself in the lunatic position of offering a few words in defense of Darwin's doctrine. To speak of the "total absence" of intermediate fossil forms is to speak too strongly. There are plenty of intermediate forms, as I point out in my response to Randy Wadkins. The trouble is more subtle but in the end more perplexing: the absence of crucial intermediate forms, and the fact that the overall fossil record seems so very strongly biased in favor of a snooze-alarm pattern in which stasis is followed by speciation.

The metaphor Mr. Gordis attributes to Fred Hoyle is a simile, and was invoked not by Hoyle but by his collaborator, the astrophysicist N. C. Wickramasinghe.

I AGREE with J.R. DUNN that Darwinian theory is essentially 19th-century in its cast, and that it has not undergone the systematic development of other 19th-century scientific concepts. In two respects Darwin was attempting to solve a problem he could not state. Knowing nothing of biochemistry, he was unable to suggest how random variations and natural selection might account for biochemical complexity. In his provocative new book, *Darwin's Black Box*, Michael J. Behe has investigated a number of biochemical systems or machines and concluded that more than a century after Darwin became common dogma, we still have no idea whether a Darwinian mechanism was responsible for the bacterial *flagellum*, the cellular protein transport system, the immunodefense system, or the blood-clotting mechanism.

By the same token, Darwin was unable to determine whether his theory could, even in principle, account for high-level biological systems—language, for example, or the mammalian visual system. In the case of biochemistry, we can at least describe the systems; in the case of higher-order systems, we cannot even do that, so that asking whether they are accessible to a Darwinian mechanism is an exercise in irrelevance.

In observing that natural selection is often presented as a universal doctrine, Mr. Dunn has put his finger on a tender nerve in contemporary thought. The great ideological structures of the 20th century lie in ruins. Outside the academy, no one would think to identify himself as a Marxist. But the ideological *impulse* is as strong as ever, and there yet remains in Darwin's thought an unsullied temple.

ARTHUR B. CODY is right twice: first in calling attention to the way writers in any number of fields have adopted a careless and largely incoherent form of Darwinism, and second in predicting the way many Darwinian theorists would respond to criticism.

AS TOM SOUTHWICK notes, there are daunting improbabilities associated with the spontaneous creation of life, or specifically with the spontaneous creation of the informational macromolecules. These impropabilities are what drove Francis Crick to his inspired suggestion that life arose elsewhere in the universe and was simply sent here. But the situation, as Mr. Southwick indicates, is even worse. Life must not only have found the

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dime's worth of area in which things work, it must also have *stayed* there once the initial happy discoveries were made. Some biologists estimate that there are fewer than 1,000 working protein *families* in nature (see *Science* 273, 1996 for a fascinating new discussion by Hao Li, Robert Helling, Chao Tang, and Ned Wingreen).

When we pass from simple macromolecules to complex biological structures, the situation is always the same. There is Mount Improbable, to use Richard Dawkins's fine metaphor, and there is Something Eager, puttering around at the base. In time, Something Eager makes it to the top of Mount Improbable. But how? The usual approach taken by Darwinian theorists to avoid the invocation of a miracle is to suggest that Something Eager need not climb Mount Improbable directly: a slow ascent by an ever-turning spiral will do as well. Something Eager need only acquire a toehold, which the odds do not prohibit, and thereafter natural selection acts to conserve stray successes.

As I have said repeatedly, I think this is a mistake. When natural selection is given its proper Darwinian interpretation as a force or property denied access to the future, it loses its power to seal off random success. It is this point that my Head Monkey was intended to establish. Once he has been dismissed from the scene, the Darwinian mechanism again acts randomly. In one way or another, all Darwinian scenarios involve an attempt to bring that monkey back.

Like so many others, Tom Southwick finds theology an awkward business. Me, too.

THE 1995 Statement on Teaching Evolution cited by JOHN WIESTER strikes me as a superb example of the gibberish to which biology teachers are so often prone. I can just imagine the furious wrangling in the committee room as the document underwent its eleventh and final revision. Still, I would not take the result too seriously. Gibberish is its own punishment.

AS NANCY R. PEARCEY suggests, there is no way to understand the organization of, say, the bacterial cell without such concepts as code and codon, transcription, translation, information, and the like—the concepts, that is, that are left over when biochemistry is subtracted from molecular biology. Still, the fact that DNA is a code does not yet mean that it is a language or even much like a human language. A natural language is organized to express human thoughts, its concepts constrained by human needs and purposes. This is not true of DNA.

The central role attributed to information by so many theoretical biologists seems to me problematic, if only because it is endorsed so warmly by Richard Dawkins. Information is a property of strings of symbols. It is a mistake to regard the information resident in the genome as somehow a measure of a quantity resident in the whole of a complex organism, the more so since we have only the haziest idea how the genome translates its fantastically complex message from one dimension into three. "[T]he central and still unsolved problem is, how do genes direct the making of an organism?" (Rudolf A. Raff and Thomas C. Kaufman, *Embryos, Genes, and Evolution*, 1983). Until we know that, I, for one, would hold off on claims that "the origin of life and its myriad of forms must be recast as the origin of biological information."

I VERY much appreciate DAVID J. MANDEL's kind words.

THE CONTRAST which LARRY EUBANK points out, between the very tentative nature of the evidence supporting evolutionary theory and the offensive self-confidence of many evolutionary biologists, is one of those mysterious coils that history in its cunning simply leaves lying about. What makes the situation so strange is that evolutionary biologists seem utterly determined to maintain positions from which physicists have long fled. It is the physicists, after all, who have been struck by evidence of design in the cosmos; books pour from the press explaining how this or that feature of the physical world—the fundamental constants, for example—simply could not have been an accident. The biologists will have none of it. Theirs is a world unyieldingly material, with Daniel Dennett, for one, prepared to extend natural selection to the very firmaments themselves, whole universes mutating joyfully or winking out of existence after having failed to make the cosmic cut.

But this is to explain the smugness of evolutionary biologists by an appeal to intellectual lag. No doubt, other forces are at work. The defense of Darwin's theory by writers like Dennett or Dawkins is at least in part a calculated *political* act,

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a statement about who is to control the ideologies of a democratic state.

I HAVE some sympathy for HENRY SHERMAN's sense of his own plight, and sympathy as well for the sense of betrayal his letter conveys, perhaps at an unconscious level. It is a measure of the utterly immoderate claims made by evolutionary biologists that we should all feel the intellectual universe emptied when those claims are challenged or found wanting.

As TOM BETHELL notes, there is a feeling both among biologists and the public that the intellectual foundations of biology may be about to crack. Many biologists are unhappy with what is sometimes called *ultra*-Darwinism; they imagine that they can camouflage their distress by attaching their allegiance to a version of evolution that has been emptied of controversy by being evacuated of content. It is by means of this tactic, Mr. Bethell observes, that evolution has become a sonorous synonym for change.

Evolution is but one issue. Contemporary biology has also been one of the damp breeding spots from which the mosquito of materialism arises. If we are in general disposed to identify the human mind with the human brain, or to look into the eyes of an ape and find reflected there no absolute difference between species, we are simply giving expression to the reach and influence of biological thought. So, too, if we assume, against all evidence to the contrary, that living creatures emerged spontaneously from the world of matter, the first bug clambering from some warm little pond somewhere, eager to get on with the business of infecting millions.

Like Robert Shapiro, Tom Bethell has not mentioned his own contribution to the debate. His articles (in *Harper's* and the *American Spectator*) were unique in having offered readers a lucid objection to Darwinian theory at a time when the gesture itself was certain to invite ridicule.

THE CONTRAST that DANIEL LAPIN draws between Joshua Chamberlain and William Provine is both painful and poignant. Chamberlain was convinced that the laws of nature are God's ways seen by man. In this, he echoed Gerard Manley Hopkins: "The world is charged with the grandeur of God. . . ." There is no question that civil society would be much improved if these sentiments were widely shared. But an innocent conviction of grace, once lost, cannot easily be regained.

William Provine's remarks, by way of contrast, seem enviably hard-headed, almost brutal. It is perhaps this brutality that persuades so many readers that what he says is correct. It is surely not the claims themselves: not one of them is true.

To Rabbi Lapin, a choice between Chamberlain and Provine is inescapable. I demur. While Chamberlain and Provine cannot both be right, they may well both be wrong.

CERTAIN BIOCHEMICAL systems, MICHAEL J. BEHE argues, are not only complex but *irreducibly* complex. Irreducibly complex systems have two crucial properties. First, only one of the possible arrangements of their parts is apt to allow the system to function; it is this feature that distinguishes complex objects, such as watches or the human kidney, from such structures as a modern city, which are not complex in this sense even though they contain many parts or actors. Second, the parts of an irreducibly complex biological object are mutually dependent.

Darwin's theory requires complex structures to be built by accretion—one small change after another. But if a system is irreducibly complex, there is no advantage to be gained from intermediates; usefulness arises only when many interacting parts play their roles simultaneously. Looking at a number of biochemical systems, Mr. Behe argues in *Darwin's Black Box* that they could not arise by a Darwinian mechanism.

Surely, one would think, this claim has already been investigated by the biological community, the matter settled. Not at all. What Mr. Behe has done, apparently for the first time, is to show how much sheer bluff has gone into contemporary versions of Darwin's theory.

SINCE IT seems my pleasant duty to toot other men's horns, may I point out that PHILLIP E. JOHNSON is the author of *Darwin on Trial*, a remarkable book indicating, if nothing else, that evolutionary biologists have held to a shockingly low standard of argument and evidence.

I DISAGREE with JEFFREY SATINOVER's assessment of Darwin's theory. If there is nothing it cannot explain, it follows that it cannot explain anything. In any case it is not Darwin's theory that accounts for variations "at the level of DNA." Genetic variability is an open problem *within* Darwinian theory. Whatever the capabilities of genetical algorithms, they are only remotely connected to the biological world.

But all this seems beside the point in the context of Mr. Satinover's long and fascinating letter. There are, he is convinced, certain anomalies in the scheme of things. The emergence of ever more complex neurological systems is an example—the pattern of increasing complexity, he believes, is not entirely explicable in physical terms. True; but *nothing* in the physical world is entirely explicable in physical terms. Physics is a profoundly nonphysical discipline, making use of such abstract objects as forces, fields, functions, and the like.

Quantum mechanics is without doubt the strangest, most counter-intuitive theory ever devised by the mind of man, and Mr. Satinover is right to be astonished. He and I part company when he attempts to draw,

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from the history of 20th-century physics, lessons for evolutionary biology.

Can one, he asks, treat all of life as a gigantic random machine, operating according to the principles of nonlinear (chaotic) dynamics? Or is life best understood in terms of quantum computations involving "impossible" noncomputable results? Whatever Mr. Satinover may be after here, the alternatives he offers are unclear. Nonlinear or chaotic dynamics? Surely not: these are mathematical descriptions and must be used with care. Quantum computations involving noncomputable results? Huh?

I have not read the work of Koichiro Matsuno, but I would like to know how quantum fluctuations bear in any way on genetic mutations. Quantum fluctuations are quantum events; mutations are not. I am intrigued by the idea that the global morphology of a complex biochemical structure has an influence on the pattern of its development—this is René Thom's leading idea (*Structural Stability and Morphogenesis*, 1975), and indeed it is as old as Aristotle—but I simply see no reason to involve quantum mechanics in the whole business.

Still, there are more things in heaven and earth than are dreamt of in any philosophy. This is Mr. Satinover's real point. I hope that it is true.

A GREAT deal of the evidence for evolution, RUSSELL ROBERTS suggests, arises from a grand and unsupported extrapolation. The speckled moth changes its wing coloring; bacteria develop drug resistance. Why should this count in favor of the thesis that whales are derived from ungulates, or men from fish? Plodding steadily upward on any given mountain, the Darwinian climber (a.k.a. Something Eager) is bound to find that there are certain places forever out of reach—the surface of the moon, for example. The Darwinian argument of evolution by accretion is itself missing a crucial step, one that would demonstrate either from first principles or from close observation that complex biological structures are accessible to a Darwinian mechanism, and so function as a mountain peak rather than as the surface of the moon.

THE TRIUMPH of Darwinian thought, M.P. SCHÜTZENBERGER often reminded me, occurred later in France than in the United States; Darwin's thought did not fully establish itself in official intellectual circles until the development in the late 1940's and 1950's of a powerful French school of molecular biology. Although profoundly impressed by the achievements of that field, M. P. Schützenberger also deplored the coarsening of thought that it brought about. A physician as well as a mathematician, he saw himself as a defender of the great French tradition of speculative biology (or natural philosophy), a tradition stretching from Cuvier to Lucien Cuénot. His criticisms of Darwinian theory were in many ways an attempt to express the insights of that tradition by means of the modern mathematical tools that he himself introduced into French intellectual life. Recently, he had come to believe that the fundamental distinction between the physical and the biological world was that biological creatures live in time, a medium, or dimension, that does not exist in the physical world. Einstein and Gödel both thought time an illusion; Schützenberger took their insight and reinterpreted it so that the illusion became a characteristic of biological systems.

Marco Schützenberger and I spent a year working together day in and day out on a book devoted to evolution; we accumulated a great many notes, but in the end, circumstances compromised our plans and our book was never finished. M.P. Schützenberger died on July 29 of this year.

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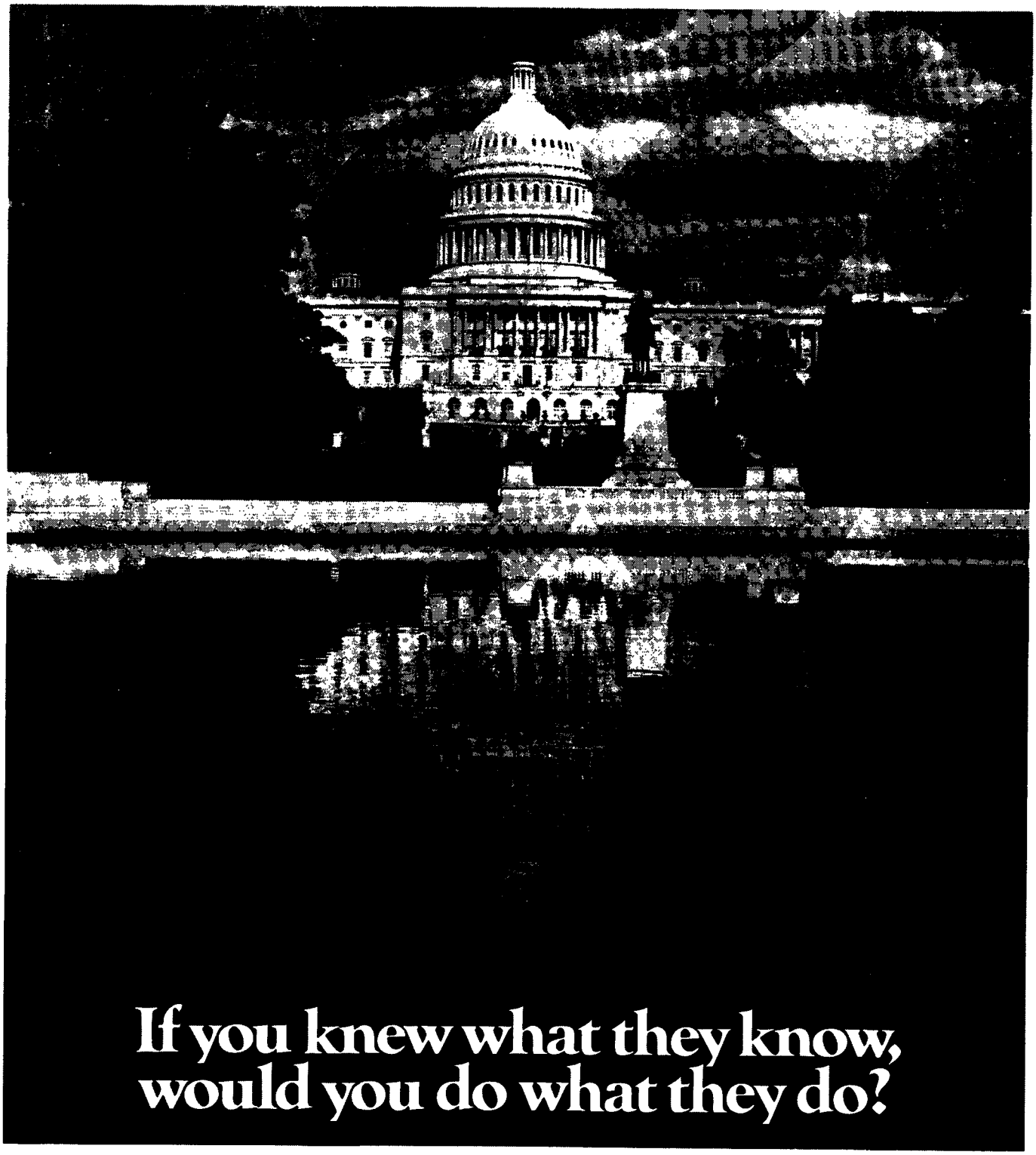

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Commentary
September 1996

Can the Schools Be Saved?

Chester E. Finn, Jr.

PUBLIC EDUCATION in the United States is a vast enterprise, involving some 45 million young people, or three-fifths of all Americans under the age of nineteen; 85,000 schools; 5 million employees; and a cost to taxpayers of more than a quarter-trillion dollars annually. Vast as this enterprise is, it is also increasingly precarious. The evidence is by now so familiar as hardly to bear repeating:

- In 1994, according to the National Assessment of Educational Progress (NAEP), six out of seven eighth-graders were not "proficient" in American history, and 57 percent of high-school seniors registered "below basic" in this subject.
- In the same year, three out of four seniors were less than "proficient" in geography; 30 percent lacked even rudimentary understanding.
- Two out of five fourth-graders, including two out of every three black and Hispanic youngsters, can hardly read at all. Among high-school seniors in 1994, only 36 percent were "proficient" in this most basic skill.
- Almost half the entering freshmen in the California state-university system in 1994 required remedial instruction in reading or math or both—the fifth straight year in which this number has increased.

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This ever-expanding catalogue of inadequacy and outright failure has led to a development full of significance for the future: a broad cross-section of America is losing faith in public education itself. In one 1995 survey, 72 percent of respondents voiced concern about drugs and violence in local schools, 61 percent complained of low standards, 60 percent of a lack of attention to "basics." In the words of the report summarizing the data, "support for public education is fragile and porous." Even Albert Shanker, president of the American Federation of Teachers, has declared that "time is running out on public education. . . . The dissatisfaction that people feel is very basic." Or, in the recent words of David Mathews, a former secretary of the Department of Health, Education, and Welfare, "Americans today seem to be halfway out the schoolhouse door."

Indeed they do. Hundreds of thousands of families are already paying private firms to tutor their children in skills and branches of knowledge they are not acquiring in school. Others have increasingly begun to opt out altogether. Private-school enrollment, though still below the "market share" it attained in the 60's and early 70's, has risen faster than public enrollment for the past five years; Catholic schools have arrested their long-term slippage; and home schooling is on the rise.

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CAN THE institution of public education be saved? Should it be?

However one answers these questions, there can be no doubt that the *principle* of public education runs deep in our society. The American Founders clearly believed that some general provision of education was necessary if democracy was to prosper. Though the word "education" appears nowhere in the Constitution—it was a responsibility reserved for the states—the writings of the Founders are replete with references to the need, as Thomas Jefferson put it, to "enlighten the people generally [so that] tyranny and oppressions of body and mind will vanish. . . ."

By the mid-19th century, the rationale for public education had become very ambitious: universal schooling would not only equip the poor as well as the rich with skills that would enable all to succeed economically, but it would also foster and reinforce American civic ideals, in particular by easing the assimilation of immigrants and thus strengthening national unity. Horace Mann (1796-1859), the foremost educational thinker of his day, conceived of schooling as "the great equalizer of the conditions of men—the balance-wheel of the social machinery."

In fulfillment of these ideas, government gradually but inexorably became involved with the delivery of education. By the 1840's, Massachusetts, under Mann's leadership (and borrowing heavily from the Prussian model), had established the elements of a universal system of government-financed and government-run elementary schools. By the 1850's, New York City had a semblance of public schooling. And as newer territories joined the union, their constitutions all embraced a state obligation to furnish education to the citizenry.

But no sooner was the mid-19th-century model established than it began to change under the pressure of various movements of "reform." The cumulative effect of these waves of reform has much to do with where we are today.

Perhaps the earliest such wave was romantic progressivism, which introduced into the schools Rousseauian notions of "natural" learning. Rather than imposing the judgment of adults about what was worth learning and how it should be taught, classroom activity, it was held, should center on the interests and proclivities of the young. By the 1920's, progressivism was joined and extended by the "mental-hygiene" movement, whose thrust, as the psychiatrist Yale Kramer has written, "was to transform the goals of the public school from education to therapy. The schools were to produce not informed and skilled students but students with healthy personalities."

Progressivism had its undeniable virtues, especially when contrasted with the exclusive reliance on rote memorization of some 19th-century classrooms: children do learn best when the material they study is interesting, the teacher is encouraging, and their minds are engaged. But progressivism was nevertheless in tension with the notion of externally set standards and vigorous, teacher-led instruction. In many schools today it has been carried farther still. There is no punishment, no confining rows of desks, no wearying homework, no prescribed program of study, little respect for authority, and less discipline. In contributing to this state of affairs, progressivism and the various contemporary incarnations of the mental-hygiene movement have been a calamity, depriving children of basic skills while providing an amplitude of activity designed to augment empty concepts like self-esteem.

A different fruit of the progressive movement in American history was civil-service reform. The changes it brought had less impact on what went on in the classroom and more on how schools were governed. Reacting against the widespread practice of reserving educational slots for patronage, reformers lobbied for the creation of nonpartisan structures. In localities across the country, they succeeded in establishing elected or appointed boards consisting of eminent, public-spirited citizens who in turn entrusted their executive duties to certified professionals.

This had the beneficial effect of putting public schools beyond the sometimes avaricious grasp of mayors, aldermen, and party bosses. But it also had the less than desirable consequence of sealing off the whole arena of educational policy from the self-correcting mechanisms of democratic politics. Today, public schools may not be at the mercy of patronage machines; instead, they operate in an anaerobic environment in which interest-group self-dealing flourishes away from the public eye.

Even as civil-service reforms were insulating the schools from politics, the disciples of Frederick Winslow Taylor (1856-1915), the "management-science" genius, began to apply his precepts to education. A heightened emphasis came to be placed on credentialed expertise, disinterested professionalism, orderly management, and uniformity. By the thousands, small school sys-

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tems were consolidated into districts in which only state-licensed teachers could be hired; principals and superintendents were also required to obtain professional certificates. Once again there were some benefits, and once again there were costs: colleges of education gained a stranglehold on entry into the profession; the priorities of parents and communities receded beneath the theories and dogmas of professors of education; and villages and towns lost direct control of their children's schools.

The most damaging changes to public education came after World War II. One source of trouble was the expanding role of the federal government, which made its debut in this arena in the 1950's in the name of combating racial segregation. In the 60's, Washington came to play an even greater role on behalf of the poor. In the 70's and 80's, it extended its reach dramatically to feed a growing army of special interests. Thus dawned the era of 1,000-page federal-education statutes and a 5,000-person federal Education Department managing hundreds of distinct programs, each with its stakeholders, state and local bureaucratic counterparts, and a bewildering array of regulatory requirements.

Of course, many of the problems the federal government stepped in to tackle were genuine, beginning with the shame of the "dual" school system for whites and blacks. But federal expansion also meant that schools came to be enveloped in red tape, and many policy disputes that had formerly been settled at the local level were now drawn into national politics.

The growth of Washington's role was mirrored by a process that had equally far-reaching implications: the conversion of teachers' professional organizations into the two giant unions known today as the National Education Association and the American Federation of Teachers. As with most union movements, workers with bona-fide grievances—wretched pay, bans on marriage for female teachers, race-based hiring—joined together to win better terms of employment. With the passage of time, however, the unions came to push onto the bargaining table all manner of policy and management decisions. By generously funding the political campaigns of friendly candidates at every level of government, they gained immense power within the public-education system. Today the teachers' unions have become a formidable bulwark against any true reform of our educational mess.

As if all this were not enough, perhaps the greatest harm befalling public education over the last few decades has come from the intellectuals. The currents of deconstructionism, relativism, and multiculturalism that gained force in the nation's universities in the 1960's and 70's, and then spilled over into the broader society in the 1980's, have left a deep imprint on the schools. It is visible in the pervasive teaching of revisionist anti-American accounts of history, in separatist literature seemingly designed to heighten ethnic discontent, and in the growth of bilingual education, which has turned the traditional mission of the schools on its head by *slowing* the pace at which immigrants assimilate and thus contributing not to the unity but to the further balkanization of American culture and society.

PARENTS, THEN, are right to be up in arms about the schools; politicians are right to be exercised; and professionals like Albert Shanker are right to be alarmed. Indeed, ever since the United States was labeled a "nation at risk" in 1983 by the National Commission on Excellence in Education, a new movement of school reform has taken root. Today, it is a whole industry, staffed by thousands of experts and funded by generous federal and private grants. In a manner characteristic of all such undertakings, its primary output appears to be innumerable conferences, journals, books, studies, and—considering the magnitude of the problem—precious little else.

The most common approach of the school-reform industry has amounted to piecemeal tinkering with the countless gears and levers of the existing educational machinery: upgrading teacher-training programs, stiffening graduation requirements, installing modern technology, revamping reading programs, shrinking class size, adding a period to the school day, and on and on through hundreds of variations and permutations.

Certainly, many such changes are worth making. Ample evidence exists, for example, that tougher graduation requirements impel students to take more challenging courses, Better training for teachers and modern information technology help, too, in their own ways. But piecemeal reform will not fundamentally alter the working of a system in such serious disarray. As Steve Jobs, the full-time computer pioneer and part-time school reformer, wrote earlier this year:

> I've probably spearheaded giving away more computer equipment to schools than anybody else on the planet. But I've had to come to the

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> inevitable conclusion that the problem is not one that technology can hope to solve. . . . It's a political problem. . . . The problems are unions. . . . The problem is bureaucracy.

And Jobs is hardly alone.

A more ambitious reform strategy concentrates on redesigning individual schools. Its proponents would devolve management authority away from the central bureaucracy; empower principals; and experiment with novel designs for school structure and curriculum. Examples include Chicago's local school councils, the fast-spreading charter-school movement, and the seven competing school-design "teams" underwritten by the New American Schools Development Corporation.

Many of the reforms proposed under this rubric make considerable sense, creating a variety of possibilities within school districts and, ideally, enabling parents to choose among them. But in the end this approach, too, faces severe constraints. Resistance from entrenched interest groups has already been great, and seldom has much real power—like the right to hire and fire teachers—actually devolved. Innovative governance schemes have often deteriorated into bickering or paralysis. Finally, in a country with tens of thousands of schools, the proportion of educators with truly fresh ideas and the courage to take risks is too small for an approach like this to transform the entire enterprise.

A different and still more far-reaching tack concentrates less on structure than on substance, bringing academic standards, curriculum, textbooks, tests, and teacher training into national or statewide alignment. This strategy underlies President Clinton's "Goals 2000" program and the efforts by many educators, business leaders, and governors to impose uniform standards on entire states and communities. Here, again, there is much to praise in principle, but there are also pitfalls that have been well-illustrated in practice. For one thing, standards are easily hijacked by ideologues—as we have seen in the recent uproar over national history standards.* For another thing, to press so many divergent elements into true alignment would require additional layers of bureaucratic regulation and the kind of top-down control that has created so much difficulty in the past.

The most radical solution of all is perhaps better characterized as an abandonment of the public-school model than as a reform. Voucher and privatization advocates believe that the market (fueled by the tax revenues that are now directed exclusively to public schools) can rise to the challenge of educating America's young. A number of Wall Street firms have already sponsored conferences for investors eager to play in this emerging field, and several corporations are launching ambitious schemes for privatizing education much in the way security services have been privatized in neighborhoods weary of inadequate police protection. The grass-roots have also become engaged: at one end of the movement, a lobbying organization called the Separation of School and State Alliance is agitating for a complete halt to "government-compelled attendance, financing, curriculum, testing, credentializing, and accreditation."

Would thrusting the schools into the rigors of the marketplace have a beneficial effect? It would certainly free some youngsters from the dead hand of awful schools, and it would crack the government's near-monopoly that now protects such schools. It should also foster innovation and flexibility, although only if a degree of entrepreneurship arises which private schools have thus far rarely demonstrated. But such a move faces intense political opposition from the entire public-education establishment. Nor is it yet clear that for-profit schools can yield a competitive return to investors while providing solid skills to those children whom the public schools have failed most notoriously: namely, the inner-city poor. Finally, the scheme might well conduce to the creation of separatist schools that reject the American civic culture even more forcefully than conventional public schools, under the spell of multiculturalism, are already doing.

Do I have a better way? What I have is not so much a blueprint as a set of principles, and a concept of what an American public education worthy of the name should look like. In other words, I would start from where we want to get to, not from where we are, although I would also borrow freely from the reform strategies already being tried.

To begin with structure: public education ought not mean government-run schools. Society's obligation is to see that instruction is provided and that learning occurs. It is not to operate a bureaucratic system of uniform institutions staffed by government employees.

* See Walter A. McDougall's "Whose History? Whose Standards?" in COMMENTARY, May 1995 and "What Johnny Still Won't Know About History," July 1996.

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As I envision them, public schools would continue to be open to all, financed by tax revenues, and accountable to elected authorities; they would thus remain public in every significant sense of the term. But—and here I side with the advocates of vouchers and other such schemes—the schools would also be accountable to their clients, who would be free to select among them and never forced against their will to attend a bad one. The management of the schools would be "out-sourced," "chartered," "contracted," or "co-oped." This means that schools might be directed by groups of parents or teachers, by private firms, or by nonprofit organizations.

Ending the present monopoly of the bureaucrats and unions would liberate thousands of capable educators to break with the orthodoxies of their profession and create schools that parents might actually want their children to attend. Such schools would differ in dozens of ways: style of pedagogy, form of organization and governance, mode of discipline, hours of operations, and so on, up to and including curriculum, at least those elements of curriculum that fall outside the common core.

Where would that core come from? We have had enough sorry experience with standards to have learned that academic experts are not to be trusted with writing a curriculum designed either to inculcate basic skills or to foster civic culture; nor can this task be left entirely to individual teachers and schools, much less to the federal government. Although I am as allergic as the next person to Rockefeller-type commissions, they are not all bad—the one that produced the *Nation at Risk* report in 1983 had much to commend it—and a panel of respected civic, business, and intellectual leaders, *privately* constituted, might be able to frame a core "curriculum of national unity" for states and communities (and textbook writers and test-makers) to adopt if they find it meritorious, and to suggest the performance standards that would denote student mastery of such a curriculum. That, at least, would be a beginning.

Most critically, the schools I have in mind would be built not around intentions, expenditures, or credentials, but around academic results. Examinations, devised and administered from without, would assess whether and how well the curriculum is learned. Students, teachers, and principals would be held accountable for performance, and real consequences would follow from failure and success.

IN SHORT, what I would do is to encourage freedom and rigor at once: freedom of structure, rigor of substance. Above all, however, by means of that substance I would restore to the schools their vital role in fostering, reinforcing, and transmitting the sense of a common civic culture.

Here perhaps is where I differ most fundamentally with recent reform strategies, virtually all of which focus on useful skills and enhanced productivity. If that were all we wanted from our schools, we might well stick with the efforts of the privatizers, standard-setters, and tinkerers. They have shown signs of modest progress and, particularly with greater political support, would likely make more.

But the narrowly utilitarian function of public education was only part of Horace Mann's vision, and should be the lesser part of our own. Simply put, the great project of public education in America should not be the creation of skilled workers but the formation of Americans. If our children do not assimilate a common body of knowledge and values, a shared set of customs and institutional arrangements, there will be little to prevent us from falling even farther apart as a nation.

Yet there, precisely, is the rub. National cultural transmission may be the most pressing task before public education today, but it is also the one task rejected out of hand both by many of the staunchest defenders of the public schools and by many of their most ardent reformers. Worse: although it is a task which seems to have fallen by default to the schools alone, they can hardly be expected to perform it alone.

For reasons having little to do with education *per se*, the base on which the old model of public education was originally constructed—namely, the assumption of an already existing common culture, sustained by home, church, media, and national political institutions, not to mention a wide network of consensual ideas and social habits—has broken down. It would be foolish to suggest that the schools, which all too faithfully reflect the condition in which we find ourselves, can single-handedly mend it. Although I believe that a full-fledged revolution from within could indeed recreate a worthy form of public education, even the best of schools cannot recreate a sound civic culture—and that, alas, not only is the more urgent, but may be the prior, task.

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Of "Rats" and Women

Wilfred M. McClay

By now, anyone not holed up in a cave for the past few months must be aware that, in a seven to one decision handed down on June 26, the U.S. Supreme Court ordered the Virginia Military Institute (VMI), a publicly supported, all-male, collegiate-level academy in Lexington, Virginia, to open its doors to women. Barring an unlikely effort by VMI alumni to privatize the institution by purchasing it from the state of Virginia—an effort that could cost anywhere from $100 million to $400 million, and would almost certainly end up making VMI a target for further litigation—this ends a long, expensive, and emotional legal battle, and with it 157 years of tradition at one of the nation's most venerable and tradition-conscious institutions.

The school's superintendent, Major General Josiah Bunting III, has vowed that VMI will continue its mission of creating "citizen-soldiers" equipped for leadership in civilian and military life, a task it undertakes through a uniquely harrowing "adversative method" designed to build physical and mental discipline and moral character among its "rats," or cadets. But Bunting also acknowledges that with the admission of women, "the architecture of VMI will be changed" in ways that cannot be anticipated. Virtually no one thinks it can continue to be the same institution it has been.

That fact is cause for celebration in some quarters, lamentation in others. But even those who sympathize with VMI's plight—and there seem to be a goodly number of Americans who do—are likely to conclude that its day has passed. Indeed, on the basis of established civil-rights law and the equal-protection clause of the Fourteenth Amendment, this case (and the similar case of the all-male Citadel in South Carolina, which received national publicity during the Shannon Faulkner episode of 1995) would appear to have been a virtual slam-dunk. The Court had already addressed the general issue of single-sex public colleges in its 1982 *Hogan* opinion, written by Justice Sandra Day O'Connor, which ordered the nursing program at the Mississippi University for Women to admit men even though there were comparable programs at other public institutions in that state which already did so. The outcome of *Hogan* ought to have alerted VMI to its own problematic future as a public single-sex institution, and have spurred it to devise some kind of solution. But it did not—at least, not until it was too late.

The school's troubles began in earnest in 1989, when, in response to an anonymous complaint by a female high-school student in Virginia, the Justice Department challenged VMI's

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all-male admissions policy. Not satisfied with the school's response that the presence of women would disrupt its extraordinarily demanding physical and mental regimen and thereby undermine its pedagogical *raison d'être*, then-Attorney General Richard Thornburgh filed suit on the young woman's behalf.

That action initiated a lengthy and tangled sequence of legal events and directives, mostly revolving around state efforts to devise a single-sex academy for women that would be sufficiently "comparable" to VMI to pass judicial muster. But the resulting Virginia Women's Institute for Leadership (VWIL), located at Mary Baldwin College in Staunton, Virginia, has now been dismissed by the Court as a "pale shadow" of VMI, even though it has been in operation only for one year. It is no coincidence that the opening sentence of the Court's majority opinion, written by Ruth Bader Ginsburg, refers to VMI as an "incomparable military college"—a double-edged commendation if there ever was one.

Justice Ginsburg's (perhaps intended) pun illuminates a genuine problem at the heart of the separate-but-equal strategy which the state of Virginia had attempted to pursue. For what would it have meant for a newly founded women's institution to be "comparable" to VMI? Should such an institution have attempted to offer all the same "adversative" features, only with a strictly female cast of characters? Or should it have reflected prevailing differences between men and women, not only in their physical attributes but also in their cognitive styles and modes of leadership? Were these to be women from Mars—or from Venus? And, more importantly, was there any chance one could find and recruit enough of them to create and sustain an institution comparable in size and scope to VMI? Probably not.

But an equally compelling point could be made against the opposite, "integrationist" strategy now commanded by the Court. In fact it was the point made by Bunting and VMI supporters: namely, that the presence of women would so change the institution as to deny *all* its students the kind of distinctive education they might have hoped to get there. As Jeffrey Rosen put it in the *New Republic*, the tiny minority of women who might come to a coeducational VMI "will be unable to achieve the precise benefits they seek," because "the Institute in its current form will no longer exist." They will, by their very presence, transform the school beyond recognition.

That transformation is coming anyway, thanks to the Supreme Court. However distinguished VMI's history, however praiseworthy its graduates (who include the likes of General George C. Marshall), however successful its operation, however great its public benefits, it cannot be allowed to stand if those benefits are not universally distributed. Thus spoke the Court, and the *New York Times* editorial page wasted no time before swooning over "the powerful eloquence and bold sweep" of Ginsburg's opinion, which, the paper intoned, was "sure to be remembered as one of this term's high points." Remembered it will be, though bold it was not.

Upon closer examination, the decision proves to be yet another of those confusing and undefinitive texts, full of opacities and loose ends, that we have recently come to expect from the Court. The Clinton administration had sought to use the VMI case toward a clear if questionable end: namely, to extend the exacting legal principle of "strict scrutiny," currently used to assess questions of racial discrimination, into the areas of sex discrimination. But this Ginsburg declined to do, suggesting only a vague standard of "skeptical scrutiny" (which would require an "exceedingly persuasive justification" before discrimination could be permitted), a standard that seems to be a bit higher than that of "intermediate scrutiny" (which requires merely that the discrimination serve "important" government objectives). Then again, it is hard to say anything definite about such jelly-like language. Perhaps a more reliable indicator is the fact that spokeswomen for both the National Organization for Women and the Women's Legal Defense Fund tempered their satisfaction at the defeat of VMI by protesting bitterly about the circumscribed scope of Ginsburg's ruling.

Why did she hold back? Ginsburg's opinion seems to reflect many of the contradictions and ambivalences of contemporary feminist thought. On the one hand, there is the core vision of strict equality: "Women seeking and fit for a VMI-quality education cannot be offered anything less under the state's obligation to afford them genuinely equal protection." And: "However well this plan serves Virginia's sons, it makes no provision whatever for her daughters." As for the notion that women are not up to the "adversative" training meted out by VMI, Ginsburg will have none of that: "VMI's 'implementing methodology' is not inherently unsuit-

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able to women"; "some women . . . do well under [the] adversative model"; "some women are capable of all of the individual activities required of cadets, and can meet the physical standards VMI now imposes upon men." To contend otherwise, according to Ginsburg, is merely to indulge that "ancient and familiar fear" which formerly kept women out of, for example, the legal profession.

That, as I say, is on the one hand. On the other hand, despite her disdain for gender stereotypes, Ginsburg ends up employing them herself. Thus she argues that admitting women to VMI "would undoubtedly require alterations necessary to afford members of each sex privacy from the other sex in living arrangements and *to adjust aspects of the physical training programs*" (emphasis added). But if that is "undoubtedly" so, then just which standards does Ginsburg have in mind when she asserts that VMI's methods are not "inherently unsuitable" to women? We are not here speaking of small changes on the margins of VMI's "implementing methodology," as Ginsburg's language would seem to imply. Rather, the complete absence of individual privacy, the uniformity of standards, all the way down to the shaved head of every "rat," are central features of VMI life. (At the formerly all-male Citadel, changes to protect female cadets' privacy—and to allow lipstick and nail polish—are already being planned, subject of course to review by the federal courts.)

It may be, then, that Ginsburg held back from a standard of "strict scrutiny" in this case because she understood what a torrent of opportunistic litigation it would unleash, leading in unpredictable directions and perhaps threatening areas of collective special treatment for women, particularly in the military and in affirmative-action programs, and perhaps in women's single-sex colleges. Whatever the reasons, her ambivalence did not make for boldness or judicial clarity.

Similar contradictions peppered the statements of feminist leaders who blasted the hoary "stereotypes" about women's inability to withstand the rigors of VMI's boot-camp-like "rat line," or insisted as a matter of right that women deserved entry into the educational experience and professional network offered by VMI—and then, when it was useful to do so, turned around and denigrated VMI as a veritable cesspool of violence, abuse, and misogyny, "the very rear of the rear guard."

When the decision itself came down, Judith Lichtman of the Women's Legal Defense Fund enthused that "it unequivocally outlaws the use of gender-based stereotypes." But a week later, Marcia Greenberger of the Women's National Law Center warned that any attempt to impose identical physical standards on males and females at VMI would be "in conflict with both the letter and spirit of the Supreme Court decision," and would be challenged in court. Apparently, both stereotyping and non-stereotyping are now actionable offenses.

In any event, it is unthinkable that the "rat line" could survive as a common base-line experience at a coeducational VMI, if only because it is hard to imagine well-mannered VMI men routinely dishing out such treatment to women—and just as hard, in our current litigious climate, to imagine women taking it for very long.

Is IT, then, "difference" or uniformity that lies at the heart of Justice Ginsburg's vision, and that is expressed in her reading of the Fourteenth Amendment? Some observers have seen in the Court's past term a movement toward strict, individualistic, rights-based, nonprivileged, and nonclassificatory egalitarianism, a theme which supposedly unites such otherwise disparate actions as the VMI ruling; the case (*Romer* v. *Evans*) in which the Court struck down a Colorado state constitutional amendment prohibiting a "protected status based on homosexual, lesbian, or bisexual orientation"; the rejection of racial gerrymandering (*Bush* v. *Vera* and *Shaw* v. *Hunt*); and perhaps also the decision to let stand a lower court's anti-affirmative-action ruling in *Hopwood* v. *Texas*.

If this is indeed a trend, there is something to be said for it, especially at a moment when group identity has become such a pernicious and pervasive influence on our social life and legal codes. But there is also a clear sense in which today's expansive and assertive doctrine of individual rights, based on an expansively understood Fourteenth Amendment, worsens what is already an ominous trend in our national life by severely retarding our ability to deal sensibly with real human difference.

One such unalterable difference is sex. While one may be grateful that the Court has not yet taken the analogy between race and sex to the limit, Ginsburg's own inconsistencies on the subject reveal just how dangerous it is to pretend that, when it comes to differences between the sexes, one size fits all, or that all human beings

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and human relationships can easily be placed on a commensurable scale. It is the failure to recognize this—or the unwillingness to recognize it—that makes the VMI decision so appalling, however convinced one may be of the abstract principle that public funds should not be used to support exclusive institutions.

It is especially strange, on the face of it, that this repudiation of human difference should come at a moment when single-sex colleges for women have gotten a new lease on life, after being nearly swamped by the wave of coeducation, and when there is a new appreciation of the advantages of keeping students at some remove from the strains and distractions of the dating/mating game. True, little of this has carried over so far into perceptions of all-*male* institutions, which rightly feel themselves opposed by a hostile *Zeitgeist*. Although David Riesman and Elizabeth Fox-Genovese, strong supporters of single-sex schools for men and women alike, testified on behalf of VMI and the Citadel, and argued forcefully for the many admirable and distinctive qualities that those institutions cultivated in their students, their words went almost completely unheeded.

Nevertheless, the VMI decision, and the direction it represents, will surely affect the prospects of *all* public single-sex schools. Witness, for example, the flap over the proposed public junior-high school for girls in Harlem: the ACLU, in opposing the project, has based itself explicitly on the strictly egalitarian reading of the VMI decision. Or witness the federally directed disbanding of Men of Madison, an imaginative after-school program for black males in suburban Washington, D.C. In fact, one of the notable virtues of VMI and the Citadel—though apparently one the Court did not find "exceedingly persuasive"—is their extraordinary success with black students, who thrive in circumstances where the "adversative" method levels the playing field, reduces consciousness of racial difference, and breaks down traditional barriers to interracial friendship and comradeship.

The Court's decision will make it exceedingly hard to create more such environments, or even to maintain the ones that already exist. In addition, it may well have a snowball effect upon all sorts of public institutions, calling into question the legitimacy of single-sex classes, single-sex sports teams, etc. As Justice Antonin Scalia observed in his withering dissent in the VMI case, the main hope of such institutions now lies in the Court's penchant for unprincipled and inconsistent decision-making.

In the long run, the VMI decision is likely to threaten the future of *private* single-sex colleges as well. The distinction between public and private in American education may be clear enough in theory, but it is very permeable in practice. Given that many private colleges and universities absolutely depend upon large sums of federal assistance, including such indirect support as student-loans, there will be no stopping Uncle Sam from jerking their chain, whenever he wishes and for whatever reason he wishes.

Women's colleges, it is true, may continue to argue for their exclusionary admissions policies on the grounds that they play a kind of compensatory, affirmative-action role (a function that men, of course, being universally cosseted and all-powerful, do not need). But that argument is already pretty hard to swallow when one considers the socioeconomic profile of, say, Smith or Wellesley students; it becomes utterly implausible in light of the roughly equivalent numbers of men and women entering the nation's most prestigious graduate and professional schools. The 26 private women's colleges which offered a brief in support of the suit against VMI may thus some day come to regret their shortsightedness.

"Diversity" is as close as one can come to an unassailable ideal in American life today, and it was invoked reverentially by all parties in the long VMI battle. Like any ideal, however, it can be employed to cover a multitude of sins, and even to mean its opposite—namely, a deadening uniformity. That certainly seems to be the case here. For what is being lost in the manic leveling of the Court is, precisely, the diversity of American higher education.

There is both a dated and a mechanical quality to the perspective offered by Justices Ginsburg and O'Connor: one would think we still lived in a world in which women were being excluded from Harvard, Yale, Princeton, and the professional schools, rather than one in which coeducation is overwhelmingly the norm. In the current environment, the perpetuation of a few single-sex institutions takes on a very different meaning. Even the liberal columnist Ellen Goodman, in her joy at the Court's ruling, admitted that VMI was "less a threat to women's rights than an anachronism."

Besides, if diversity were truly our goal, why

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should *institutional* diversity be ruled out of court? The self is formed in culture, and, as David Riesman has often argued, a college is a culture. As such, it has to have certain principles of organization which give it cohesiveness and purpose, and help it produce individuals who will stand for something distinctive in the mix of American society. In other words, the preservation of individual diversity may require the preservation of institutions that are themselves, in some respect, not diverse, and that may even be exclusive. VMI has exemplified this insight to a very high degree, and its supporters well understand that, having lost its principle of exclusion, it will also lose its ability to produce anything very distinctive.

Needless to say, not all forms of institutional diversity are worth preserving, and some forms of exclusion are intolerable. But this particular form eminently deserves preservation, and for the very same reasons that it came under assault in the first place. We are living in an era of extraordinary confusion with regard to the respective characteristics of men and women, and to the best ways of educating them. Every kind of institution, so long as it is not actively harmful to the conduct of our collective life, is, potentially, a national resource, a bit of evidence bearing upon the larger questions that confound us. In this respect, VMI's "anachronism" is precisely its virtue. It is *because* coeducation is now the standard—and a far from unproblematic one—that we should do all we can to preserve other examples, other ways of doing things, as a hedge against an uncertain future.

HENCE THE power, in the VMI case, of Justice Scalia's lapidary dissent, which excoriates the arrogance of those who fancy they are living in the age of ultimate truths, and that all vestiges of the past deserve to be erased. Yes, Scalia admits, our forebears were closed-minded, "as every age is, including our own." But this much can be said for them: "they left us free to change." The same, however, cannot be said of

> this most illiberal Court, which has embarked upon a course of inscribing one after another of the current preferences of the society (and in some cases only the countermajoritarian preferences of the society's law-trained elite) into our Basic Law.

How, indeed, do the Justices, or their fans and cheerleaders, know? How can they be so sure? Do the unbridled social and sexual pathologies in which we are awash give them not a moment's doubt that we may be on a disastrously wrong path? VMI may have had its problems, and certainly could have dealt with them better than it did. Nor will the world come to an end when VMI changes. But neither, one fears, will the fanaticism of its opponents, who in the name of equality and individual rights are bent on stamping out the very freedom they claim to dream of.

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Defenseless America

Angelo M. Codevilla

When, this past April, Hezbollah forces in Lebanon launched waves of short-range ballistic missiles (Katyushas) at northern Israel, President Clinton responded by unveiling Nautilus, a high-tech, ground-based laser device that TRW is cobbling together out of American space-laser technology and that will be made available to protect the Galilee region. Only a month earlier, however, when China, in one of the most ominous and underreported developments in the post-Soviet atomic age, openly threatened to hit Los Angeles with a nuclear-tipped missile, no one in our government considered this an occasion to begin treating missile defense *for America* as an urgent matter.

Yet the threat posed by ballistic missiles has, in fact, never been more urgent. Advancing technology has created numerous classes of weapons fit for a wide variety of military missions, and is placing them in ever more hands around the globe. According to the CIA, 25 countries are or may be acquiring ballistic missiles and/or weapons of mass destruction, whether nuclear, chemical, or biological.

The most notorious case is North Korea, a country whose people are starving but which has probably amassed enough nuclear materials for a handful of bombs. To carry them, North Korea has also developed the No Dong, a missile that can reach Seoul and Tokyo; and it is developing the Taepo Dong II, which can reach the rest of Asia plus Alaska and Hawaii.

The North Koreans are marketing these missiles in the Middle East, where Iran is one overt customer. The Taepo Dong I would allow Iran to hit much of Europe and, of course, Israel. But Iran is also shopping in Russia, which is marketing the SS-25 and the SS-19, state-of-the-art intercontinental missiles. With these, Iran or anybody else could hit U.S. soil.* Ukraine has established a secret "strategic-cooperation" relationship with Libya, which reportedly involves the transfer of missile technology. Ukraine is also negotiating with China to sell the technology for SS-18 missiles—the world's most powerful.

China already has intercontinental missiles that are exact copies of our old but excellent Titan II. Meanwhile, China is selling CSS-2 medium-range missiles to Pakistan; these could be loaded with locally made nuclear weapons and aimed at India, which is itself developing a second-generation, medium-range missile to carry

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* The missiles are being offered for sale ostensibly as launch vehicles for satellites. The difference between a space launcher and a missile lies in how the guidance system is programmed.

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nuclear weapons in the opposite direction. The Indians are also marketing their new missile in the Middle East.

Iraq, Algeria, and Libya are in the market for Indian as well as for North Korean missiles, but especially for Russian (and, in the case of Libya, Ukrainian) ones. Libya is also carving into a mountain what appears to be a bomb-proof factory for chemical/biological weapons, as well as a garage for mobile missile launchers. Depending on who sells the Libyans what, they would be able to threaten at least Europe and the Middle East, and possibly even the United States, with showers of anthrax spores that could kill millions.

Once upon a time, the ballistic-missile threat to the West was characterized by a rare combination of circumstances: the technology was exotic, and it was held by the Soviet Union, a relatively steady regime which would in any case be restrained (so the reasoning went) by the very awesomeness of nuclear weapons and by what was then known as the balance of terror. Today, ballistic missiles, especially the non-nuclear variety but increasingly the nuclear as well, are more and more frequently the fruit of ordinary technology, and they are in the hands of people who run the gamut of human qualities from the responsible to the nasty, the unpredictable, and the uncontrollable. The internationalization of graduate study in the sciences, and computer-aided design and manufacturing, allow any government to acquire world-class talent and equipment. Moreover, the international market relieves anyone of having to reinvent the technical wheels of missile warfare. So whoever wants missiles is likely to get them, and whoever wants to use them probably will.

In fact, ballistic missiles are becoming the weapon of choice for international coercion. They can cause major damage to others at the push of a button without the need to mobilize an army, and, as Saddam Hussein showed when he hit Israel with Scuds, they can strike an adversary whom one's armies cannot defeat. It is reasonable to expect that countries wishing to form regional empires will use missiles to bully their neighbors, or as part of larger military operations.

There are other uses as well. By successfully threatening a neighbor with missiles, a regional power may demonstrate the worthlessness of that neighbor's alliance with America. This is what North Korea has tried to do to South Korea, and China to Taiwan. As a consequence, Japan has been led to wonder about the wisdom of relying on an America that cannot protect its friends, and has initiated a domestic discussion about alternative arrangements for Japanese security. This in itself is bad news: were Japan to become a fully autonomous power, we would lose many of the peaceful fruits of our victory in World War II. Similarly, were missile threats from Iran or Iraq to force Saudi Arabia to lose faith in us, we would cede the benefits of the influence we have exercised in the Persian Gulf for 40 years.

Then, too, missile-wielding governments could blackmail *us* into acquiescing in their power grabs. If Saddam Hussein had possessed a missile capable of reaching U.S. soil, America would have hesitated even more than it did before interfering with his conquest of Kuwait and his intimidation of Saudi Arabia. By the same token, China's threat to destroy a defenseless Los Angeles if we meddled in its plans for Taiwan forced a fateful choice: though an actual attack was unlikely, any demonstration of China's capacity to carry one out—like a nuclear explosion at sea off Taiwan—would have rendered the risk intolerable. (By contrast, had we been able to defend Los Angeles and Taipei against missiles, China would not have advertised its own impotence by brandishing them.)

Our capacity to influence the outcome of many international disputes will depend on our ability to provide protection from missile attack for ourselves and for our clients. Indeed, as Margaret Thatcher argued on the 50th anniversary of Winston Churchill's Iron Curtain speech at Fulton, Missouri, and again at the Prague congress of the New Atlantic Initiative this past June, if Western capitals are defenseless, a Western foreign policy worthy of the name is altogether inconceivable.

II

TECHNICALLY, DEFENDING against ballistic missiles presents a challenge not much greater than building them. By the time America's first missile made its test flight in 1958, a radar was waiting near the target to pick out the warhead, and an air-defense rocket was being upgraded to hit it. Over the decades, as the technology of missiles has advanced, so has that of anti-missiles. If, year after year, the U.S. government has decided not to deploy defenses, it is not for lack of technically competent means.

From the 1960's through the early 70's, de-

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fending America against missiles would have meant dotting the country with a dozen radars, each the size of a corporate headquarters, and surrounding them with interceptor rockets, each carrying a nuclear warhead. (The radars would have had to be big in order to see incoming warheads far enough away, and in enough time, to launch the interceptors so that the inevitable nuclear explosion would not be felt on the ground.) There was no doubt that these devices would work, although legitimate technical questions persisted about the cost of defensive versus the cost of offensive weapons, as did inherently unanswerable questions about how many enemy warheads might "leak" through in case of various hypothetical "all-out" attacks.

But such doubts were not the reason the defensive complex was never built. The reason was the ABM (anti-ballistic-missile) treaty of 1972, according to which, in exchange for our commitment to remain vulnerable to attack, the Soviet Union agreed to cap the number of its most threatening missiles at 300, and eventually to reduce that number.

By the 1980's, however, ABM treaty or no, the most threatening category of Soviet warheads had grown twenty-fold, thus reviving American interest in defense. By then, new technologies were available. Infrared detectors on satellites could track and discriminate among missiles and their warheads sooner and better than huge ground-based radars. Thanks to infrared guidance and to microprocessors, interceptor rockets were now so accurate they no longer needed nuclear explosives. Moreover, defenders were no longer bound to wait for the warheads to detach themselves from their missiles but could more efficiently attack the missiles themselves by means of laser weapons in orbit.

Thus the stage was set for Ronald Reagan's announcement of the Strategic Defense Initiative (SDI) in March 1983. According to a widespread misconception, Reagan called for *deploying* the new and emerging technologies; in fact, however, SDI was a research program only, and in any case Reagan spoke as passionately of a new utopia to be achieved through arms control as he did of safety to be achieved through defense. Still, even though it did not propose the creation of actual weapons, the SDI program stimulated a huge debate about the performance of hypothetical ones. Opponents argued (correctly) that many of these were unfeasible, and that there could be no such thing as a multilayered, fully integrated system, guaranteed to intercept 99.5 percent of whatever might be sent against it. They also argued (incorrectly) that any defensive system could be defeated by offensive countermeasures ("the responsive threat"). So the 80's passed in fruitless comparisons of nonexistent offenses and defenses, and in pork-barrel projects that spent $30 billion and left America defenseless.

For a brief period after the collapse of the USSR in the early 90's, it seemed to some optimistic observers that we might be entering a period when we could successfully pretend that a whole class of weapons had never been invented. But then Saddam Hussein actually used ballistic missiles in warfare, and Kim Il Sung showed just how widely the technology of missiles and nuclear weapons had spread. Meanwhile, defense technology had taken a few more forward steps: the quality of satellite information concerning incoming warheads had become so precise as to obviate (in many cases) the need for ground-based radars; guidance systems for interceptors had become still more reliable; and the beam directors for space lasers had become instantly retargetable.

By the mid-90's, the demise of SDI had left only a few development projects standing, but these were relatively far advanced toward constructing actual prototypes of anti-missile devices. Unlike in the mid-80's, the feasibility and cost of each device were no longer in question. Best of all, discussion now focused on the real issue of how each device would perform, rather than on inherently nebulous estimates of overall system performance.

III

SUPPOSE, THEN, we wished to take advantage of what technology offers us. Although there is no scientific way of knowing how much missile defense would be enough at any given time, common sense suggests that we should begin by trying to stop the kinds of missiles and warheads that might be launched against American soil. These are the world's fastest and most sophisticated—but, as it happens, devices for handling them are just as easy to build as devices for handling lesser threats, or easier.

Most of these devices can be launched from the ground or from ships. The key to their performance is a series of satellites called the Space and Missile Tracking System (SMTS), which provides enough information to launch intercep-

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tors long before incoming warheads become visible to radar. Since interceptors launched early have more time to adjust their course, the speed at which incoming warheads are traveling, which has been a big problem until now, is of relatively minor significance. SMTS satellites could be in place by 2001, and they would extend the range, accuracy, and effectiveness of every American interceptor against all kinds and speeds of warheads.

The Patriot PAC-3, successor to the well-known device from the Gulf war, carries one such class of interceptor; the first units could be ready by 1998. Though they are the most radar-dependent of all American defenses, a battery of PAC-3's with a dozen interceptors, if it were also using information relayed back from space, could be relied on to defend a few square miles against a half-dozen moderately fast warheads at a time. A few dozen batteries could thus protect sizable U.S. military forces operating on hostile shores.

The problem with a defensive weapon like the PAC-3, which has to sit close to the target, is getting it there: each battery, minus its support units, would take at least two of America's biggest transport aircraft. Worse, no amount of Patriots could protect sprawling, unfortified populations (like Los Angeles). For that purpose, the intercepts must occur far enough away so that nuclear, chemical, or biological residues do not fall on the targets. The main reason debris from Scuds and Patriots rained down on U.S. troops, and on Tel Aviv, during the Gulf war was that the Patriots could not be fired until their radar had searched for and found the Scud—all too close to home.

If the PAC-3 operates inside the atmosphere and near the target, the Army's Theater High Altitude Area Defense (THAAD), whose first units could be available in 1999, has a radar that sees farther and an optically guided interceptor that is supposed to hit a warhead on the edge of the atmosphere. Unlike Patriot, THAAD can launch simply on the basis of accurate data from satellites, and hence the system can intercept missiles more than 100 miles away from cities. Although moving each THAAD battery would take at least four giant planes, it could provide a meaningful defense if the targets to be protected were small or few and if the incoming warheads were neither too fast nor too numerous.

Then there is the Navy's Upper Tier system, which uses the radar of existing AEGIS air-defense ships but whose very fast, optically guided interceptor can also rely on information from satellites to hit a warhead over 1,000 miles away. Since Upper Tier hits its target at very high altitudes, moreover, it has an excellent chance of intercepting the fastest warheads; and since its range is potentially so great, it could be brought to bear against warheads coming into any part of a vast area.

If the Navy goes ahead with its tentative plans for equipping 22 existing AEGIS cruisers with 650 Upper Tier interceptors beginning in 1999, coastal America, plus allies like Japan, plus parts of Europe and Israel that are accessible from the sea, could count on considerable protection. Upper Tier could also be deployed in fixed stations on land to cover territory away from the coast.

Finally there is the space-based laser (SBL), the only device now under development that can hit missiles soon after they are launched—i.e., while their engines are still boosting them into ballistic trajectory. Work on this chemical-fired device began under the Carter administration, was nearly brought to a halt under the SDI program in favor of more glamorous ideas long since discredited, and since then has limped along on reduced funding. Nevertheless, the Pentagon, Congress, and industry agree that a test model could fly by 1999. Each SBL, depending on distance, could destroy a missile by focusing on it for one or more seconds; could hit missiles of all ranges regardless of origin; and could carry enough fuel for a hundred "shots." A dozen truck-sized SBL's in orbit would cover the earth. Greater numbers would ensure more robust, overlapping coverage.

Each of these weapons would be useful by itself, and all would be more useful together. Some areas, like the Galilee in Israel or a beachhead occupied by American or allied forces and threatened by low-grade missiles, might require only the less potent devices. But since these areas can be hit by fast, sophisticated missiles as well, and since, with some exceptions, the space laser and the Upper Tier system can take care of low- as well as high-grade missiles, it would make sense to buy space-based lasers for boost-phase defense, plus the Navy Upper Tier system to catch the remaining missiles in mid-flight, and to install units of the Navy system in inland parts of the U.S., making sure that they could launch interceptors primarily on the basis of cues from SMTS satellites. How many of each

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weapon we might want for the long run can be decided only in the long run; the essential thing is to begin.

IV

BUT THAT is not likely to happen. For one thing, the Clinton administration, backed by liberal opinion and most Congressional Democrats, has a different view of the threat with which we are faced. Citing a special National Intelligence Estimate (NIE) completed by the CIA in December 1995, the President has argued that it may take ten years before North Korea's Taepo Dong II, the most advanced "rogue-state" missile capable of reaching U.S. soil, will be fully operational*; that missiles being built in other third-world countries do not appear to be of intercontinental range; and that it will take quite some time for such countries to develop intercontinental rockets from scratch.

What about missiles in the hands of Russia and China? These, the President contends, are not threats at present, but if we started trying to defend U.S. soil, the Chinese and especially the Russians would turn their shaky strategic cooperation with us into outright enmity. Hence, by trying to defend ourselves, we would be creating threats that do not now exist—threats that we could not defend against no matter how hard we tried.

In short, the only real missile threat in the world today is the one which third-world nations pose to one another, to U.S. allies, and possibly to U.S. troops abroad, but not to American soil itself. We are meeting that threat, the President asserts, by building theater missile defenses (TMD) like Nautilus; what we must not do is to embark on a national missile defense (NMD) designed to protect the United States, something which not only is unnecessary but would involve us in a possible violation of the ABM treaty.

These arguments are open to objection. The NIE, to begin with, overlooked the obvious: since third-world countries are *not* building missiles from scratch, but rather are buying major pieces of technology as they go along, their missiles will be ready much sooner than a decade from now; should they begin to buy missiles outright, they could have them tomorrow. As for the missile force in possession of the Russians, it will surely change hands many times during its remaining half-century of useful life, and no one can predict with utter confidence the character of those hands at any given moment; and as for the Chinese, they, as we have seen, have already made explicit threats to use missiles against us. In other words, the demise of the Soviet Union and the "opening" of China have far from foreclosed the threat of nuclear war.

But the heart of the administration's position rests in its preference for defending "theaters" threatened by short- or medium-range missiles over defending the "nation." This distinction does not reflect technical or military facts, or even geography. The various theater-missile-defense devices, including the Nautilus laser now being prepared for northern Israel, would be, for that country, a national defense—and the same goes for American theater missile defenses deployed in Korea or Japan against threats from Pyongyang or Beijing, or in Italy against threats from Tripoli or possibly Belgrade.

Indeed, the Clinton administration has agreed that *Russia* can and should deploy theater missile defenses to protect itself, and everyone expects the Russians will do whatever it takes to maximize the capacity of those defenses. Russia has already developed, and is offering for sale abroad, a missile-interceptor system (the A-300) whose performance exceeds the limits the administration has set for American TMD systems. Russia has also given all its TMD interceptors the capacity to use data from external sensors (distant radars and satellites), with no objection from Washington. But the administration has refused to allow U.S. interceptors the same capability, claiming (correctly) that the use of such sensors would turn just about all theater defenses into national ones.

It would seem, then, that the only "theater" that is to be prevented from benefiting from TMD is the United States of America.

WHAT THE distinction between "theater" and "national" defense really reflects is the anti-defense logic of the ABM treaty, as applied to America alone. The treaty itself restricts missile defenses to a single site, and prohibits giving them the capacity to intercept "strategic" missiles (a category it does not define) away from that site. But, in light of the past quarter-century's developments in technical capabilities, American diplomats and arms controllers com-

* As noted above, the Taepo Dong II, already in a relatively advanced stage of development, can reach Hawaii and Alaska; as Clinton's former CIA director James Woolsey has sarcastically pointed out, these states, too, constitute U.S. soil.

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mitted to the treaty have "understood" it retroactively as requiring restraint in the deployment of whatever interceptor technology might protect American soil. Hence the new category of permissible (TMD) devices, defined by their certifiable impotence against the kinds of missiles that might reach America.

Indeed, the Clinton administration has gone farther, rejecting proposals that the U.S. deploy space-based lasers or interceptors in orbits *over the third world*, even though such devices would not be able to see or interfere with intercontinental missiles coming from Russia to America, and even though such deployments would be well within the spirit of the ABM treaty. It seems that the administration does not want the U.S. to possess any device which at some future time could be deployed to defend America, and that, one suspects, is the core of its objection to defenses in space altogether.

And the Republicans? Their presidential candidate, Bob Dole, has spoken eloquently on the need for defense, and has endorsed the Defend America Act, a bill introduced by the Republican congressional leadership which pledges to deploy some kind of national defense by 2003. But there is less to the Act than meets the eye. It does not authorize a single dollar or move forward a single weapon; if passed, it would merely constitute a promise by the U.S. government to legislate in the future. The Act does not even call for enforcing the missile-defense provisions of legislation passed in 1995-96, which President Clinton is ignoring. Nor does it call for abrogating the ABM treaty.

The Republicans' half-hearted challenge has made it possible for the President to continue proclaiming his adherence to the notion of missile defense while doing nothing about it. And as we go on dithering, others go on buying, building, and laying their plans.

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Beyond King James

Robert Alter

THE OLD cliché that to translate is to betray is sometimes unfair; but not in the case of modern English versions of the Hebrew Bible. On the face of it, this is a puzzling state of affairs. In purely quantitative terms, we live in a great age of Bible translation. Several complete English versions have appeared since mid-century, as have many individual books.* In the same period, moreover, our understanding of ancient Hebrew has been considerably enhanced by a great deal of philological, archeological, and linguistic work. It would be natural to expect all this energetic scholarship to have helped produce a vivid and precise English translation as close to the spirit of the original as to its letter.

But this is not so. Modern English versions repeatedly put readers at a grotesque distance from the Hebrew Bible. To this day, the Authorized Version of 1611 (the "King James Bible"), for all its inaccuracies, archaisms, and insistently Jacobean rhythm and tone, remains the closest we have yet come to the distinctive experience of the original.

Some observers have explained this curious situation by pointing to the general decline in sensitivity to the expressive resources of the English language, the nuances of lexical values, the force of metaphor and rhythm; and certainly our ecclesiastical and scholarly experts do not begin to match in rhetorical brilliance the committee entrusted by King James with the creation of the Authorized Version. There remain, nevertheless, some brilliant stylists among English prose writers today, and if our age has been graced with remarkable translations of Homer, Sophocles, and Dante, why not of the Bible?

The root of the problem lies, I believe, in the intrusion into the realm of translation of inappropriate philological goals. I intend here no disrespect. Without philology, reading the Bible would be like walking through a great and ancient museum with all the lights turned out. To read over the shoulder of a great philological

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* The most influential translation in this period has probably been the New English Bible, completed in 1970 and extensively reworked as the Revised English Bible (1989); this undertaking was originally sponsored by the Church of Scotland and the Church of England, with participation by other Christian groups. The New Jewish Publication Society version (1962-82) has had wide circulation among American Jews. The major new Catholic version is the New Jerusalem Bible (1985). The separate volumes of the Anchor Bible, done by different scholars with varying agendas, began to appear in 1962, but some individual books still await completion. Below the threshold of serious translation, the sundry contemporary efforts to render the Bible in basic English, colloquial American, or "gender-free" language scarcely merit discussion.

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critic like Abraham ibn Ezra (1092-1167) is to see many important but obscure things leap into focus for the first time. Once we know, for example, that the biblical *naḥal* most commonly indicates not simply a brook, creek, or stream but a very particular kind of freshet that floods a dry desert gulch during the rainy months and vanishes in the heat of the summer, Job's "my brothers have betrayed like a *naḥal*" (6:14) bursts suddenly into poetic life. But there is a great difference between philology as a tool for understanding literary texts and philology as an end in itself.

For the philologist, the great goal is clarity; but simple clarity can quickly become too much of a good thing. Literature—and perhaps the Hebrew Bible in particular—sometimes purposefully cultivates enigma, engages its audience in establishing elusive motives and connections, delights in setting ambiguities against each other in an interplay not intended to be neatly resolved. By contrast, the philologist, too often dedicated to "disambiguating" the text, ends up reducing, simplifying, and denaturing it. These unfortunate consequences are all the more pronounced if, as is often the case, the philologist also has an underdeveloped sense of literary diction, rhythm, and the uses of figurative language.

THE UNACKNOWLEDGED heresy underlying most modern English versions of the Bible is that translation should *explain* the Bible rather than simply *representing* it in another language; in the most egregious instances, this means explaining the Bible away. In their zeal to uncover the precise meanings of the biblical text for the instruction of a modern readership, translators frequently lose sight of the way in which the text intimates its meaning—which is to say, the distinctively artful manner in which ancient Hebrew prose (and poetry) deploys its resources to articulate its vision.*

One salient characteristic of biblical Hebrew is its extraordinary concreteness, manifested particularly in a fondness for images anchored in the human body. The general predisposition of modern translators, acting in the name of clarity, is to translate these images into abstract terms which bear about the same relation to the original as near-beer to fine brew.

A good deal of the biblical language I am speaking of here is what a linguist would call lexicalized or dead metaphor—concrete imagery made to stand for some more general concept, which then becomes a fixed term in the vocabulary. Dead metaphors, however, are by no means as dormant as the adjective suggests, for the ghosts of the old concrete meanings continue to hover suggestively over the new abstract ones. This is something philologically driven translators do not appear to understand.

The price paid for the avoidance of metaphor can be seen by looking at any characteristic Hebrew term and the role it plays in a biblical story. Thus, the Hebrew noun *zera'*, seed, can be understood both in the agricultural sense and in the human sense—that is, as the term for semen; by metaphorical extension, therefore, it also comes to mean progeny. Modern translators, unwilling to trust adult readers to understand this, variously render the word as offspring, descendants, heirs, progeny, and posterity. But there is evidence that the biblical writers themselves never entirely forgot the biological origin of their term for offspring.

At the end of the story in Genesis of the Binding of Isaac, for example, God reiterates His promise to Abraham, "I will surely multiply your seed like the stars of the heavens and like the sand on the shore of the sea" (22:17). If "seed" here is rendered "offspring" or "descendants," we lose the richly concrete way in which the text imposes visually, on the retina of the imagination, the picture of millions of seeds scattered like the constellations across the vast expanses of the skies, or piled on the shores of the sea. The meaning of the statement is not fundamentally altered, but its power is diminished, making it harder for a reader to sense why these ancient texts have been so compelling through the ages.

Another example: the most metaphorically "extended" body part in biblical Hebrew is the hand. Just as in modern Western languages, "hand" can be employed figuratively to express such notions as power, control, responsibility, and trust (and also, in biblical Hebrew, memorial). But most modern translators substitute one or another of these abstract terms, introducing clarity to what was already perfectly clear and

* Among contemporary Bible translations, the one signal exception to these strictures is Everett Fox's version of the Torah, *The Five Books of Moses* (Schocken, 1,024 pp., $50.00). Emulating the model of the German translation done earlier in the century by Martin Buber and Franz Rosenzweig, Fox goes to the opposite extreme from current practice: his English has the great virtue of reminding us, verse after verse, of the strangeness of the Hebrew original—but at the cost, often, of producing something that is not quite in English. The result is more a text for study than a fluently readable version that conveys the stylistic poise and power of the Hebrew.

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subverting the literary integrity of the story to no purpose.

Two sequential episodes in Genesis end with Joseph's being cast into a pit (the first is a dry cistern, the second an Egyptian prison). In both episodes, "hand" is a focusing device that defines and also complicates the moral themes of the story. In the first, Reuben, overhearing his brothers' murderous intentions, seeks to rescue Joseph "from their hands." He implores them, "Lay not a hand upon him"; a few verses later, another brother, Judah, adds, "Let not our hand be against him."

E. A. Speiser, in his version of Genesis in the Anchor Bible series, renders the key words in both these phrases as "do away with [him]." Speiser explains in his notes that it would be illogical to have Reuben or Judah say, "don't lay a hand on him," since the counsel proffered involves the opposite: seizing Joseph, stripping him, and throwing him into the pit. But that, in fact, is precisely the moral logic of the text. Neither Reuben's nor Judah's proposal is an entirely innocent one, and their plans to save Joseph do indeed involve a violent laying-on of hands. Moreover, once Joseph has headed south with the Ishmaelite caravan, those same fraternal hands take the tunic they have stripped from him, douse it in blood, and turn it over to their father, Jacob, encouraging in him the bitter illusion that Joseph has been torn apart by a wild beast.

The image of hands offering Joseph's garment as false evidence returns brilliantly at the climax of the subsequent episode in this story, in which the wife of Joseph's Egyptian master attempts to seduce him and—having failed—accuses him of trying to rape her. As Joseph flees her advances, "he left his garment in her hand" (she has, in fact, virtually torn it off his back). But in accusing him to her husband she alters the narrator's twice-stated "in her hand" to "by me," i.e., by my side, implying that Joseph had disrobed deliberately. The narrator's deployment of repeated terms has conditioned us to be attentive to these pivotal words, "he left . . . in the hand of," for in the six verses that constitute the opening frame of the story, "hand" appears four times, the last and most significant occurrence being a summary of the confidence Joseph's master Potiphar had placed in him: "And he left all that he had in Joseph's hand."

The invocation of "hand" in the two episodes thus forms an elegant *A B A B* pattern: in the first, hands are laid on Joseph, and this action is carried forward at the very beginning of the subsequent episode when he is bought by Potiphar "from the hands of the Ishmaelites"; then we have the supremely competent hands of Joseph himself, into which everything is entrusted and by which everything succeeds; then, once again, violent hands are laid on Joseph, as Potiphar's wife strips his garment from him precisely as his brothers had done; and finally, Joseph—now in prison for attempted rape—again has everything entrusted to his dependable hands by his prison-warden, the key phrase repeated twice in the three-and-a-half verses of the story's closing frame.

A kind of dialectic is thus created between the hands of Joseph and the hands upon Joseph. It is a dialectic utterly characteristic of biblical narrative, and it is exactly what is lost when translators tamper with the purposeful and insistent physicality of the Bible's language.

THERE ARE, alas, ways other than word choice in which modern English versions similarly implement the heresy of explanation. Most pervasive of these is the tendency to repackage biblical syntax for an audience whose reading experience is assumed to be limited to *Time* or *Newsweek*.

The fundamental difference between biblical and modern English syntax, it is often asserted, is that the former employs parataxis, a system characterized chiefly by the use of parallel clauses linked by "and," and the latter hypotaxis, characterized by the use of subordinate clauses and complex sentences. Modern English has a broad array of discriminations in its system of verbs, and a whole armament of subordinate conjunctions to stipulate different relations among clauses. Biblical Hebrew, on the other hand, has only two aspects of verbs (they are not quite what we call tenses), one indication of a jussive mode (when a verb is used to express a desire or exhortation to perform a given action), and a rather modest number of subordinate conjunctions. The characteristic biblical syntax is additive, and in Hebrew the "and" that links parallel clauses is not even a separate word but a particle, *vav* ("hook"), prefixed to the first word of the clause.

Modern translators generally assume that this syntax will be either unintelligible or alienating to modern readers, and that it should therefore be entirely reconfigured. But there are two basic problems with this procedure. First, it ignores the fact that parataxis is the essential literary ve-

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hicle of biblical narrative: the way the ancient Hebrew writers saw the world, linked events in it, and artfully ordered and chronicled reality. I would even argue that the decision *not* to order events in ramified networks of causal, conceptual, or temporal subordination was a conscious one: as numerous passages demonstrate, hypotaxis—the use of complicated syntactic subordination—was an available option, which the biblical writers by and large rejected.

Second, the modern translators' assumption presupposes a very simplistic notion of what constitutes modern literary English. Among the great 20th-century novelists, there is not one whose use of language and syntax resembles even vaguely the patly consistent orderliness posited by recent translators of the Bible as the modern norm. Among Americans, William Faulkner in particular echoes biblical language and cadences, while a mannered stylist like Ernest Hemingway surely had the Authorized Version in mind when he made "and" his most prominent connective. The contemporary novelist Cormac McCarthy emulates both Hemingway and Faulkner, working often with parallel utterances nearly identical in structure to biblical prose. The continuing appeal of paratactic structures for writers in our own age suggests that it remains a perfectly viable way to represent in English the studied parallelism of verbs and clauses of ancient Hebrew narrative.

STILL ANOTHER reason advanced for suppressing the ubiquitous "and . . . and . . . and" of the Hebrew Bible concerns what is called "the *vav* of conversion." This is a *vav* prefixed to verbs at the beginning of a sentence or clause, whose sole function, many contend, is not to signify "and" but to "convert" a past action to a future one, or vice versa. Yet it is far from clear that the fulfillment of one linguistic function automatically excludes all others; and it is perfectly likely that for an ancient audience, the *vav* appended to a verb both converted its temporal aspect *and* continued to signify "and." Be that as it may, the general modern practice of suppressing the "and" when it is attached to a verb has the effect of changing the tempo, rhythm, and construction of events in biblical narrative in a stylistically ruinous fashion.

Here is a narrative sequence in which the maiden Rebekah draws water for the camels of Abraham's servant (sent by his master to find a bride for Isaac). I cite it first in my own version, which reproduces every "and" and every element of parallel syntax:

> . . . and she came down to the spring and filled her jug and came back up. And the servant ran toward her and said, "Pray, let me sip a bit of water from your jug." And she said, "Drink, my lord," and she hurried and tipped down her jug on one hand and let him drink. And she let him drink his fill and said, "For your camels, too, I shall draw water until they drink their fill." And she hurried and emptied her jug into the trough, and she ran again to the well to draw water and drew water for all his camels.

Now here is the version of the Revised English Bible. The REB is in general one of the most compulsive repackagers of biblical language, but its rendering is roughly interchangeable with any other modern version:

> She went down to the spring, filled her jar, and came up again. Abraham's servant hurried to meet her and said, "Will you give me a little water from your jar?" "Please drink, sir," she answered, and at once lowered her jar on her hand to let him drink. When she had finished giving him a drink, she said, "I shall draw water also for your camels until they have had enough." She quickly emptied her jar into the water trough, and then hurrying again to the well she drew water and watered all the camels.

As it happens, the modification of biblical parataxis is not so extreme here as in other passages in the REB version. "And she let him drink his fill" has been changed into an adverbial clause, "When she had finished giving him a drink" (actually in consonance with the otherwise paratactic King James Version); "and she hurried" is compressed into "quickly"; "and she ran again" becomes the participial "hurrying again." But the most striking divergence between the two versions is that mine has fifteen "and's," corresponding to fifteen occurrences of the particle *vav* in the Hebrew, whereas the REB uses just five.

What difference does this make? To begin with, the *vav*, whatever its linguistic function, is by no means an inaudible element in the Hebrew text: we must keep constantly in mind that these narratives were composed not merely to be decoded by a reader's eye, but to be *heard*. The reiterated "and" plays an important role in creating the rhythm of the story, in phonetically punctuating the forward-driving movement of the

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prose. Its elimination in the REB and in all of the REB's modern cousins produces an abrupt, awkward effect, a kind of narrative arrhythmia.

But more is at stake here than pleasing sounds, for in the rhythmically deficient version, the heroine of these repeated actions is subtly but significantly reduced. Although she performs approximately the same acts—politely offering water to the stranger, lowering her jug so that he can drink, rapidly going back and forth to the spring to bring water for the camels—in the compressions, syntactical re-orderings, and stop-and-start movements of the modernizing version her actions are made to seem rather matter-of-fact. This tends to obscure what the Hebrew highlights, which is that Rebekah is doing something quite extraordinary—a rare biblical instance of "Homeric" heroism.

Whereas the servant asks only to "sip a bit of water," as though all he wanted was to wet his lips, Rebekah responds by having him drink his fill, and then insists on drawing water for the camels, until they too are satisfied. An ancient audience surely did not need to be reminded that a camel after a long desert journey can drink as much as 25 gallons of water, and there are ten camels here. The chain of verbs tightly linked by all the "and's" does an admirable job of conveying the image of a young woman hurling herself with prodigious energy and speed into her task. Even her dialogue, integrated syntactically and rhythmically into the chain, scarcely breaks the rhythm. In short, the parallel syntax and the barrage of "and's," far from being the reflex of a "primitive" language, are as purposeful in furthering the ends of the narrative as anything to be found in a sophisticated modern novel.

FINALLY, NO English translator I know of has seriously confronted the central question, what is the *level of style* of the Bible? Most proceed as if the Bible did not have a style at all, and therefore as if the English style chosen could be promiscuously borrowed from boardroom or bedroom or academic journal, with little regard to the precise tonality which particular Hebrew words may have carried with them from their native linguistic habitat.

Because we have no record of ancient spoken Hebrew, and because whatever evidence there once was of extra-canonical varieties of Hebrew writing has long since crumbled into dust, any conclusions we may draw about the stylistics of biblical Hebrew must be a little precarious. But should we therefore assume that the citizens of Judea in, say, the time of Jeremiah spoke as he does in his prophecies?

With regard to vocabulary, there is some evidence that what we see in the canonical books was not identical with everyday usage, and in fact may paradoxically be much more limited. As Angel Saenz-Badillos has observed in his recent *History of the Hebrew Language*,* it is hard to believe that the biblical lexicon, highly restricted as it is, could have served all the purposes of daily existence in a developed society.

The book of Job is instructive here. In his impulse to forge a poetic imagery that will represent man, God, and nature in a new and even startling light, the poet draws on highly specific terms from manufacturing processes, food preparation, and commercial and legal institutions—language that is not used elsewhere in the Bible. It therefore seems reasonable to conclude that, roughly like the French of France's neoclassical theater, the Hebrew of the Bible is a *consciously* delimited language, and that writers and audiences alike understood that only certain words were appropriate for the literary rendering of events, at least in prose.

One of the great scholarly mysteries is the emergence toward the end of the pre-Christian era of a new kind of Hebrew which became the language of the early rabbis. It is widely recognized that this new Hebrew reflected the influence of the Aramaic vernacular, and that it also incorporated a vast number of Greek and Latin loan-words. What is puzzling, however, is that rabbinic Hebrew also uses a good many indigenous Hebrew terms that either do not appear in the biblical corpus at all or are reflected there only in rare and marginal cognate forms. The standard terms in rabbinic Hebrew for sun and moon, and some frequently used verbs—to look, to take, to enter—are entirely different from their biblical counterparts, but do not seem to be influenced by any of the languages impinging on Hebrew. Where did these words come from?

In his indispensable study, *The Language of the Bible and the Language of the Sages*,† the Israeli linguist Abba Ben-David offers the intriguing and, to my mind, convincing proposition that rabbinic Hebrew was built upon a biblical vernacular which had, for the most part, been ex-

* Translated by John Elwolds. Cambridge, 400 pp., $42.95 (1994).

† Hebrew, 1967

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cluded from the literary language of the canonical texts. This biblical vernacular did not become visible in an evolved literary form until the early 3rd century C.E. in the Mishnah, which represents the written formulation of centuries of legal and homiletic commentary on the Bible. But it is distinctly possible that when a 9th-century B.C.E. Israelite farmer mopped his brow under the blazing sun, he did not point and say *shemesh*, as the sun is invariably called in biblical prose texts, but rather *ḥamah*, as it is regularly designated in the Mishnah.

There is, of course, no way of determining how far back into the biblical period various elements of rabbinical language may go. It is sufficient for us here merely to grant the likelihood that the language of the canonical texts was not identical with the vernacular, and that it reflects a specialized or elevated vocabulary and perhaps even a distinct grammar and syntax.

Let me cite a passage that may give us a glimpse of what this excluded vernacular background looked like. In biblical narrative as we have it, characters speak proper literary Hebrew, with no intimations of slang or dialect. A remarkable exception is Esau's impatient first speech to Jacob in Genesis 26. Inarticulate with hunger, he sputters, "Let me gulp down some of this red red stuff." Not only can he not come up with the ordinary Hebrew term for stew, and so makes do with *ha'adom ha'adom hazeh*—literally "this red-red"—but he uses a verb for "gulp down," *hal'iteini*, which appears nowhere else in the biblical corpus but in the Talmud is a commonly used term for stuffing food into the mouth of an animal.

Of course, words undergo semantic shifts over a period of more than a thousand years. But it seems safe to assume that even a millennium before the rabbis, *hal'iteini* would have been a cruder term for feeding than the standard biblical *ha'akhil*. What I would guess happened at this point in Genesis is that the author, in his zeal to characterize Esau's crudeness, quite exceptionally allowed himself to introduce into the dialogue a vernacular term that would jibe nicely with his phrase, "this red red stuff."

In other words, here is an exception that helps prove a rule: namely, that in its own time the language of biblical narrative was stylized, decorous, dignified, and readily identified by its audiences as a language of *literature*, distinct in certain ways from the language of quotidian reality. I would, however, stress the "certain." Biblical style is neither lofty, ornate, nor euphemistic, and if its vocabulary reflects a specialized literary lexicon, it also makes abundant use of ordinary Hebrew words, among them the recurrent terms like "hand" and "seed" on which I have commented above.

Biblical prose, then, is a formal literary language but also, paradoxically, a plain spoken one; and one, moreover, that evinces a strong commitment to using a limited set of terms again and again, making a virtue out of repetition.

WHAT IS the implication of this analysis for an appropriate modern English equivalent to ancient Hebrew style? The right direction was taken in the King James Version, following the great model of William Tyndale's translation almost a century earlier. There is no good reason to render biblical Hebrew as contemporary English, either lexically or syntactically. While the Bible should certainly not be represented as fussily old-fashioned, a limited degree of archaizing coloration is entirely appropriate, in combination with other strategies for creating a language at once stylized and direct, free from the overtones of contemporary colloquial usage yet retaining a certain timeless homespun quality.

An adequate English version should also be flexible enough to indicate the Bible's small but significant modulations in diction and its counterpointing of prose with elevated poetic insets—something the stylistically uniform King James Version entirely fails to do. And it should avoid at all costs the modern tendency toward elegant variation, the practice of substituting synonyms for the Bible's repeated words; for the literary style of the Bible turns everywhere on significant repetition, not variation. Finally, the mesmerizing effect of these ancient stories will hardly be conveyed if they are not rendered in a cadenced English prose that broadly corresponds to the powerful rhythms of the original.

Biblical Hebrew has a distinctive music, a lovely precision of lexical choice, and a suppleness of expressive syntax that by and large have been given short shrift by its translators. Although the structural and semantic differences between ancient Hebrew and modern English are immense, a translator who truly honors the stylistic integrity of biblical language may find that literary English has more equivalent resources than modern instances suggest.

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Splitting Up

Joseph Adelson

DURING THE whole of my childhood I knew only two youngsters whose families were not intact. One was a boy in my neighborhood, quiet and almost unbearably shy, whose father had died and who was being raised by his mother. The other was my classmate for part of a year in junior high school. This boy would not talk much about himself, but we were somehow able to learn that he was being raised by his grandparents, following his own parents' divorce.

This was the only divorce I and my friends had ever heard about. The boy himself was different from most of us—impulsive, hyperactive, and, though bright, unable to focus his attention on work. He became so disruptive that he was suspended from school, an event unique for that time and place. In my own family circle, his circumstances were felt to be the height of misfortune, and his fate was discussed in the most sorrowful terms. "What will happen to the poor child? What other troubles lie in wait for him?"

Within my family, indeed, broken marriage was in general viewed as an alien and catastrophic event. A second cousin, who had had a hard time establishing a career, was married in his middle thirties to a woman of the same age who had been divorced. Consternation followed. A divorcee was a fallen woman, or close to it. One of my aunts even raised the question of whether the bride was really Jewish, or had simply pretended to be in order to get a new husband. In time, that marriage settled into a most ordinary one, but suspicions persisted, and for some years the hapless woman continued to be referred to as "the divorcee."

When I grew up and looked back, none of this seemed surprising to me, given my family and milieu. In my neighborhood we were almost all working-class, immigrant, religious, Jewish, and those who were not were working-class, immigrant, religious, Irish or Italian Catholic. In these cultures, marriages, however wretched they might be, were permanent. A bad marriage was a sad but unalterable fact of life. You would no more think of exchanging your spouse for another than you would think of trading in your ailing cardiovascular system for a better one.

And so in later years I always assumed that the stern view of marriage and divorce with which I was familiar as a child reflected the provincialism of my background. Americans at large, I reasoned, although they may not have approved of marital break-up, surely took it in stride and, unlike my family, did not treat it as an unspeakable tragedy. And I therefore also assumed, when I used to read about rises in rates of divorce and unmarried motherhood among Americans, that

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we were seeing not a dramatic nationwide acceleration but just steady increases in already well-established trends. True, more marriages were ending, and more illegitimate children were being born; but these changes marked an evolution, I thought, not a revolution.

I COULD NOT have been more mistaken. In fact, in recent decades we have been witnessing *extraordinary* changes in the nature and function of the family—in marriage, child-rearing, and divorce. And these changes have not crept up on us in gradual increments: within a single generation, in some instances within a decade, we have seen doublings, triplings, and quadruplings in the incidence of very troubling behaviors. The statistics have become well-enough known, especially those concerning illegitimacy: within about a quarter-century—1970 to 1992—the proportion of children born out of wedlock increased from 11 percent to 30 percent; among blacks, the current rate is an astonishing 70 percent. Similarly, where 8 percent of white children born in the 1950's spent their childhood with one parent, for those born in 1980 the figure is 31 percent, and among black children the proportions jumped in the same period from 22 percent to 59 percent. And the figures for divorce are more arresting still: among white women marrying in the 1940's, 14 percent eventually divorced; of those married in the late 1960's and early 1970's, half are already divorced, and today there is a 60-40 chance that a marriage will end in divorce.

Commenting on these and many similar findings, Lawrence Stone, the eminent historian of the family, has written:

> The scale of marital breakdown in the West since 1960 has no historical precedent, and seems unique. There has been nothing like it for the last 2,000 years, and probably longer.

Like most good historians, Stone is not given to excess, and that statement is itself as startling as the findings he and others are addressing. Yet most of us, while noting the emergence of a "divorce problem," have somehow found ways to avoid confronting either its extent or its potential gravity. As the sociologist David Popenoe has pointed out, we have here an example of what Daniel P. Moynihan has called "defining deviancy down," a kind of mental trick whereby we ignore what will not fit into our wishes or assumptions by reclassifying behavior as normal that once would have been universally regarded as abnormal and undesirable.

In the case of divorce, Popenoe suggests, one reason we have tended to ignore or shy away from the magnitude of the problem is that so many of us are already divorced, and we do not like to think of our individual experiences as symptomatic of a troublesome *social* phenomenon. Another reason is undoubtedly the sense that to begin thinking of divorce in this way would in any event be an exercise in futility; the practice has by now become just too deeply woven into the fabric of our social life.

Yet precisely because things have gone so far, the topic of family life in general, and of divorce in particular, has actually become a little easier to discuss soberly than was the case even a few years ago. Take the derision that initially greeted Vice President Dan Quayle's 1992 venture into defending "family values." The phrase itself quickly became a *Schimpfwort*, a term of derogation and contempt, employed to signal one's distance from the sort of simpleminded sanctimony to be expected from a blockhead like Quayle. Yet as early as 1993 that judgment began to reverse itself, at least in some circles, with the appearance of Barbara DaFoe Whitehead's now-famous *Atlantic* article, "Dan Quayle Was Right," and its powerful documentation of the hazards of the fatherless home.

TODAY, THREE years later, although the "family-values debate" (to borrow the title of a seminal article by James Q. Wilson in the April 1993 COMMENTARY) continues to be driven by sentiment and in some cases by theology, opinions are also more likely to be supported by evidence from history and the social sciences. Only recently, the results of research and scholarship on the subject have been drawn together in several important books and articles by authors dismayed at what has become of us. They include David Popenoe's *Life Without Father**; Maggie Gallagher's *The Abolition of Marriage*†; David Blankenhorn's *Fatherless America***; and William Galston's essay in the summer 1996 *Public Interest*, "Divorce American Style." Though these works differ in the scope of their inquiry and in their style, all take a roughly similar position on what the authors see as the main culprit: a relent-

* Martin Kessler Books, 275 pp., $25.00

† Regnery, 288 pp., $24.95

** Basic Books, 352 pp., $23.00; reviewed in COMMENTARY by Chester E. Finn, Jr., April 1995.

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less, decades-long disestablishment of marriage as the central cementing institution of society and its replacement by the ideals of individual gratification and "fulfillment."

In one particularly useful chapter in *The Abolition of Marriage*, Maggie Gallagher examines what American courts have done to encourage conformity to those ideals. Customs and rules that grew up over centuries, she writes, have been worn away by court-imposed "rules and regulations weakening the privileged status of marriage as a child-rearing institution." As the courts have come to see marriage in the context of "equal rights," they no longer favor a married partnership over others, lest that connote an unfair preference. The push for legalizing homosexual marriage draws on this new "understanding," but it is hardly the only such effort: the New Jersey Supreme Court, for example, recently declared that ten college students who live together are the "functional equivalent" of a family. In these and other statements, as Gallagher puts it, marriage becomes simply another "close relationship situation."

What is worse, in Gallagher's view, the triumph of radical individualism has meant that the "fierce protectiveness once directed toward the institution of marriage" has been transferred, ironically, to divorce itself. Once considered an event to be avoided unless absolutely necessary, marital separation has come to be seen as morally neutral or even as a praiseworthy goal, even when children are present—and certainly easier to accomplish than the goal of saving an unhappy marriage. By 1985, over 80 percent of those surveyed in a sample of the general population felt that a couple should not stay together for the sake of the children; one suspects that among marriage "experts," the figure would have been closer to 100 percent.

Both Popenoe and Gallagher seem to feel that our country has moved toward a divorce culture without fully wanting to, and without a full recognition of its consequences, especially for children. Some of this society-wide suspension of normal moral reflexes has been due to the upbeat manner in which celebrity divorce and remarriage have come to be treated by the media. Some of it reflects the skill and persistence with which the legal and mental-health professions have publicized the virtues of no-fault divorce. The advocates of easier divorce have been able to persuade legislators that the public desperately wants change (in fact, until fairly late in the game, survey statistics apparently showed no such wish). Some of it stems from the belief that children are damaged by conflict-ridden families and would actually be better off if the source of the conflict were removed. And social scientists have done their part by interpreting provisional or enigmatic findings as support for a better alternative for children in such situations: namely, a single-parent home, free of tension.

The climate of opinion produced by this regnant ideological atmosphere still persists. Here, for instance, is the columnist Clarence Page, asking the now-clichéd question, "Which is worse for the child, a single, loving, and caring parent or two disgruntled parents whose tension is palpable and sometimes violently loud . . . ?" A somewhat more sophisticated presentation of the same idea can be seen throughout current expert writing on divorce, which typically portrays a beleaguered but "loving and caring" mother who has rescued her children from a hate-filled and often violent marriage.

But why *should* we assume that divorce is always preceded by open conflict? Some marriages die a quiet death, preceded by boredom, silent contempt, or sheer inanition. It is not uncommon for the grown children of such divorces to report how amazed they were when they first heard of their parents' coming separation, since to them the family atmosphere had been quite ordinary, or no more troubled than that of other families they knew. And why should we assume the presence of a loving, caring mother? Why not an indifferent mother, or a narcissist, or an alcoholic? Yet such mothers, though they are to be found often enough in the real world, rarely appear in the standard social-science literature.

ON THE subject of what is better or worse for children, the new studies, based as they are on very recent research findings, have much to tell us. Without exception, when one compares children from intact families with children from one-parent families where a divorce has taken place, the data offer cause for deep alarm:

- Children in such situations are twice as likely to drop out of high school, and are much more likely to do poorly in reading, spelling, and mathematics.
- Such children are two to three times more likely to have emotional or behavior problems. They rate higher on dependency, anxiety, and aggressiveness, and lower on self-control. They rate low in peer popularity.

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• They also score low in physical health and well-being.

• They show substantially higher crime rates. According to one study reported by Popenoe, "60 percent of rapists, 72 percent of adolescent murderers, and 70 percent of long-term prison inmates come from fatherless homes."

• They suffer much higher rates of both physical and sexual abuse, in the latter case most often carried out by the mother's boyfriend. Single mothers report being much more violent toward their children than do mothers in intact families.

• Finally, their problems persist. A study by Judith Wallerstein found that five, ten, and fifteen years after their parents' divorce, many children remain depressed, cannot achieve normally, and experience difficulties in love and attachment. The girls in particular are more often sexually active, likelier to contract venereal disease, to have children out of wedlock, and to enter into marriages which fail.

Almost all these studies involve American samples, but European research discloses similar patterns. One impressive study in Sweden has found significant mental-health problems among adolescents who experienced family disruption. As other countries begin to approach American levels of marital break-up—and so they seem to be doing—we may expect a correlative rise in their rates of social pathology.

OF COURSE, such studies do not—cannot—demonstrate definitive causal relations. That, indeed, is the major point made by those who play down their importance. How, they ask, do we know it is the divorce itself that produces the problems, rather than the emotional turmoil which led to the divorce in the first place? How do we know it is the loss of family that leads to poor physical and emotional health, rather than the economic hardship often entailed by divorce?

Understanding when and why divorce does or does not bring serious psychological harm to children, or when and why sustaining a bad marriage may be more harmful than breaking up, is no easy matter. Questions like these are rather beyond the practical reach of social science. (By contrast, we do know that economic privation is responsible for some, but by no means all, of the problems attendant upon the dissolution of a marriage.) What is really troubling, however, is the collective diffidence which led us until very recently to avoid the very topic.

Whether we will now somehow overcome that diffidence remains to be seen. The good news is the simultaneous appearance of works, including those I have cited, calling attention to the unprecedented crisis in which we find ourselves. Indeed, one can detect signs of a general shift in the culture at large; people are not *quite* so quick as they once were to take an optimistic view of marital separation, particularly as it affects children. But whether this will lead to a widespread change in behavior is, so far, doubtful. The dolorous statistics on the long-term harmfulness of divorce are not fully accepted, even by many specialists.

And why should they be? After all, they run counter to our persistent belief in renewal, in the limitless possibilities of the self. And they suggest something that many Americans still show no signs of wanting to hear: namely, that there is often a very high price to be paid for the individualism that is so central to the American ethos.

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The Art Biz

A Story

Allegra Goodman

In the cool dark California night, Henry Markowitz is closing up Michael Spivitz Fine Art Gallery. He has to stay open until ten on Thursday nights to take in the evening crowd. The tourists tracking in sand from the beach and the open-air cappuccino bars. Henry hates the sand and the bathing suits, but, as Michael says, this is the reality of selling art in Venice. Henry has often had to resist the urge to turn these people away. At least the ones without shoes. The one thing he cannot abide is bare feet—as if this were the concession stand at the beach and not a gallery showing the work of important 20th-century artists. Admittedly, the art works aren't originals. There are Chagall prints and Dali lithographs. They sell a great many lithographs, but they are signed. It seems to Henry that there should be a modicum of respect shown to these wisps of authenticity. Sandals at the very least.

He sweeps the parquet floor with a big push broom he keeps in the back. There is a cleaning service, but he can't help himself. Five years ago he would not have envisioned himself sweeping a gallery in Venice Beach. His thought when he went into the art business was that he would be dealing in antiquities: cataloguing, negotiating with collectors and museums in paneled rooms, and, of course, using his expertise—a Ph.D., two monographs, several articles—in early books and prints from England and France. This seemed the natural course for him while he was retooling at the Wharton School, putting a negative tenure decision and a failed grievance behind him, and, as his therapist put it, recognizing how many different life paths there really were once you opened yourself up to them.

But one thing did not lead to another. Prints and manuscripts at Sotheby's was not forthcoming. The job at Christie's in London turned out to be only seasonal. He did have a firm offer from a friend of his brother's, but assistant manager at Laura Ashley in Short Hills, New Jersey, was not for him.

"Why not?" his brother, Edward, demanded.

"Why not? It's got nothing to do with art," Henry said.

"It's retail," Ed said, brutal and succinct.

"It's women's ap-ap-ap-"

"It's a job," Ed said.

"Apparel!" Henry burst out.

"So what," Ed said, always pragmatic. "I thought you wanted to stay in New York."

"Short Hills is not, is not, New York," Henry cried. And he refused to discuss it further.

The path that did open up for him was manager at Michael Spivitz. It was not New York, but it

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was art. And Henry has been working on bringing in some original contemporary pieces. He is working on an opening for a fabulous lesser-known sculptor who works in brass, creating seed forms with uncurling stems, or sometimes miniature human figures unfolding from a central root like earthy homunculi. He has given up New York, uprooted his elderly mother and moved her to Venice, laid down his life learning to drive on the L.A. freeway, but he is still in the art business.

He is just turning off the lights when he sees someone rattling the glass doors. It is a woman with a frenzied look and flyaway hair. He gestures that the gallery is closed and she gestures that she needs to talk to him, so he lets her in. As the heavy glass opens, her voice explodes into the gallery, frantic, with a heavy Israeli accent. "My son! My son is in trouble."

"Has there been an accident?" Henry asks.

"Yes! Yes, an accident."

"Where is it?" Henry peers out into the dark street.

"Not in a car. He has disappeared."

"I don't understand," says Henry.

"You understand Hebrew?" she asks him.

He shakes his head.

"My name is Amalya Ben-Ami," she says, "I'm staying at Venice Sands. I came just a few weeks ago with my son from Haifa, and now he has disappeared."

"You've lost your son? Did you call the police?"

"Yes, yes. They can do nothing. I need you to help me."

"I?" Henry stands there in his Indian cotton shirt and stares at the Israeli woman. She wears a good deal of jewelry as well as an enormous leather handbag. It sounds like some delusional fantasy, what she's saying; she tells it to him slowly and deliberately as if he were some kind of moron who can't follow her. "The police cannot help me," she says, "Michael Spivitz has got my son. He has my child."

"Michael Spivitz?" Henry asks, aghast.

"Let me explain this to you. Your employer has got my son," she says. "He is keeping him."

"That can't be," says Henry.

Then she breaks down in front of him, just sobs in frustration, like a teacher who has tried to explain the simplest problem and has not gotten through at all. "He has stolen him," she sobs, the glow of the track lighting shining on her flyaway hennaed hair.

"That's impossible," says Henry. "It doesn't make any sense at all. My partner does not steal children."

"It's true," she says. "Do you disbelieve me?"

"But I have no idea," Henry pleads with her. "You're distraught, you're—"

She puts her enormous handbag on the floor and begins pulling out papers, her passport, her airline tickets, a letter on consular stationery. "This is his picture," she says, and holds up a photo of a tanned teenager with dark eyes. "His name is Eitan Ben-Ami."

"Look here," says Henry, "I must get home. May I call you a cab?"

She seems crushed at this and cries even more. "You don't believe me." Henry doesn't answer. "You don't listen to me."

Henry is beginning to feel nervous standing there alone with her in the gallery. "If you've lost him, this is a matter for the police," he says.

"I tell you I've gone to the police," she cries out. "They do nothing."

"Well," Henry stammers, "then there's nothnothing to be done. Now I must close up, I must get home. Please let me call you a cab for your hotel."

She stands there silent for a long time. Motionless. He begins thinking he should call the police. The police are very good in this neighborhood. Prompt and courteous. "I want to talk to a rabbi," she says suddenly in a small voice.

"I'll call you a rabbi then." Henry hurries anxiously to his desk and begins telephoning synagogues listed in the yellow pages under Houses of Worship. He leaves flustered messages on several answering machines. "This is Henry Markowitz. There is a woman here, Amalya Ben-Ami, staying at Venice Sands, and she needs to speak to the rabbi as soon as possible. She is quite dis-dis-distressed."

HENRY'S CONDOMINIUM is ordinary and white, identical to all the others from the outside, but he has hung up his herbs and garlic braid in the galley kitchen, filled the second bedroom from floor to ceiling with his book collection. In the living room a Persian rug covers most of the gray wall-to-wall carpet, and the sliding glass doors are adorned with long flowing curtains and a custom-made scalloped valance in royal blue silk. His old prints cover the walls, and in a place of honor away from the light he has hung his small but real Dürer sketch of a rabbit. He takes off his clothes as soon as he

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gets in, puts on his silk bathrobe, and runs a hot bath. He needs to soak; he needs to close his eyes and forget the day. He pours himself a drink and takes out the leftover prime rib, beets, and potatoes au gratin to heat up.

Although he lives alone, Henry cooks. He is one of those rare people capable of cooking a full dinner just for themselves. He spends time planning delicious and attractive meals, buys flowers for the table, even when he has no one else to entertain. Good food on good china, fine crystal, and old silver are necessities for him, essential to his existence. What is life without dinner? An afternoon without a good wine? A bed without fresh cotton? A house without flowers? Only emptiness.

He sinks into the bath and the water flows over him. He is a tall man, fleshy and pink, his curly hair receding, his deep-set eyes heavily shadowed from compulsive nocturnal scholarship. For Henry still keeps up with the literature in his field, and still works at writing articles—actually, one article—late at night propped up in bed. The water flows into his pores, relaxes his muscles; he feels his whole body uncoiling.

Then the phone rings. He closes his eyes. He called her from the gallery hours ago, but she is calling anyway. The phone rings eleven times. He gets up with the water streaming off him, wraps a towel around his waist. "Hello, Mother," he says.

"I've bought seats," Rose tells him.

"Seats for what?"

"The seats for Yom Kippur," she says.

"Mother, I've already told you I can't do it."

"I don't understand that," she says.

"I can't take off the whole day."

"The whole day! *Yizkor*, the memorial service—half-an-hour in Dad's memory. And Maury's."

"But Mother, it's an hour drive each way. I simply cannot take off the entire afternoon."

"If I could take the bus—" she says.

"You can't take the bus."

"If I could, I would take the bus. I bought the seats today. I don't think they have refunds."

"Mother, you should have talked to me before you bought it."

"I did talk to you."

"And what did I tell you?" Henry asks wearily.

"You told me the same thing you're telling me now."

"And then why did you buy the seat when I said I wasn't going?"

"Because you should be going," Rose says. "One day a year you should stop and think."

"I do think about Dad," Henry says. In fact, he has been thinking about his father a lot lately. He and his therapist have spent hours in the past year and a half working through Henry's feelings toward his father.

"I mean, you should think about me," says Rose.

"Mother, I haven't even had dinner yet," Henry says, "I'm exhausted; I've been on my feet the whole day, and I think my prime rib is drying out."

The next morning at the gallery Michael says, "Henry, you look tired."

"Michael, I've had such a night. A woman came here looking for you. A lunatic insisting her son was missing and you had him. Twice I nearly called the police. I thought she might pull out a gun."

"Oh, I know," Michael says. "She's been harassing me for weeks." He sits down at his desk. "I'm sorry she gave you such a fright." Michael is Canadian, and when he says sorry he pronounces the word "sohry." He is a fair-haired man, tall and slender with a blond mustache and blue eyes.

"But where c-c-could she have developed these fantasies, these delusional fantasies?" Henry asks.

"I don't know. She seems completely obsessed," Michael says. "She calls me constantly. I'm having my number changed."

"Good God," says Henry, who is not English, but often speaks with an English inflection when moved. He thinks for a minute and then says, "She's clearly blaming you for her son's disappearance. But why? How did she meet you?"

"Well, through him," Michael says. "He's staying with me."

The blood rushes to Henry's face. "The boy?"

"Well, yes," Michael says, looking up from his paperwork with limpid blue eyes.

"With you? You? But why?"

"Because he wants to," Michael says.

"But he's fifteen!" Henry exclaims.

"Actually, he's sixteen," says Michael.

"But he's a child."

"Henry." Michael comes around to the front of the desk and touches his arm. "I'm not *keeping* this boy. He's had some problems with his mother, that's all. He asked if he could stay with me."

"But the police! But he's a child!"

"We've all spoken to the police. I asked him.

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They asked him: do you want to go back to your mother? And I'm afraid he said no. Apparently he's a U.S. citizen, and so he can stay as long as he wants. His father is American."

"Michael, I'm—I don't know what to say." He can feel himself blushing, his cheeks hot.

"Henry, Henry, Henry," Michael murmurs, his voice patronizing and sweet. Henry is probably fifteen years older than Michael. "But such an innocent," Michael would say during the time they lived together when Henry had first moved out to L.A. "Henry, Henry, Henry," Michael would soothe and chide him, alternately smoothing and ruffling his feathers. It had taken Henry two years to work up the courage to leave. Two years to give up Michael's house, his cars, his sleek kitchen, his beautiful things, his quick glances, sure touch, his sweet voice with just the faintest tang of sarcasm.

HENRY LIES face down, naked on the table for his massage. "So how's the art biz?" Jason asks as he kneads Henry's back and shoulders.

"It's—it's—" Henry begins.

Henry lies there on the table, stiff as a corpse, his big fleshy body tight and unyielding to Jason's touch. It's true he's wound tight. His mind is full of Michael and Michael's nonchalant news. That this boy, this very young boy, is staying with him. He has no trouble believing the boy is staying there of his own free will. In that house? With the view, that spa and swimming pool? With Michael's wines?—he wouldn't appreciate the wines—but the ambience, Michael himself. It is all intoxicating. And to one so young. How *could* he? The thought is utterly horrible, and yet Henry cannot chase it out of his head.

"Wow, you're just so tight today," says Jason. "I feel like I can't get under your skin." Henry looks up at Jason and feels his anxiety compounded with embarrassment. He can't relax. He just can't do it. And he had always found Jason's hands so beautiful, and Jason himself so amusing, with his surfer talk and his classical face, the long eyelashes about which Jason is vain, always curled, so that he looks like one of those rare Greek statues with the agate eyes still left in the sockets and lashes of beaten and curled copper. If it had been Jason it would be one thing. Jason is grown-up, not an adult exactly, but a grown-up boy. This fifteen- or sixteen-year-old—what difference does the year make?—this little one can't possibly understand. He couldn't possibly know what Michael is about. Henry has "been there" as they say, "been there and back," "been through it all." How many different euphemisms are there for that web? The spidery path of Henry's anxious youth and innocent middle age.

Already, before he gets home, already while driving, Henry feels a migraine blossoming, opening like an enormous Magritte rose into every empty cavity of his head. He feels its manifold petals pressing against his ears, against his eyes, even behind his jaw. As he enters the apartment he holds this terrible flower high and still, so as not to ruffle it. He takes his medication, lies on his bed with all the curtains drawn, and watches the colors behind his eyes. Hours pass. Far away he hears his neighbor's television, the condo's yard service with the leaf blowers. Slowly he gives way to nausea. Then he sleeps.

How is he to look at Michael without thinking of this terrible thing? This boy in the house. For several days, Henry can barely look him in the eye. And yet, Michael has done a great deal for him. He took him on when he had no experience, and gave it to him. He believed in Henry's managerial skill and trusted Henry's taste. He befriended Henry when he had almost no one and introduced him to a first and then a second therapist. He was an agent of change in Henry's life, a messenger from outside the gates of the academy. He gave him courage, declaring, Open your eyes to the world, come out and scale the walls! Exchange your scholarly obsessions for a new career. Leave the shadowy libraries for the bright, blinding California sun.

Henry continues to steel himself each day at the gallery. He says nothing, but as he works, he argues with himself. He sits and does the books at his table in the back. Of course, there are certain feelings, desires, but must every passing interest turn into an acquisition?

Henry sits there and he is ashamed. He isn't worthy to make the analogy, desire and the collector's acquisitiveness. After all he is in the business, pricing and selling lovely things. He looks at Michael and feels indignation mixed with guilt. If only he could tell him off. If he could speak to him with some authority and say, this is wrong, this is foolish. But he is too close to pass judgment. Confounded, compromised. He has been in the past a little like Michael and a little more like this boy. He has felt them both within himself, the tiger and the lamb.

The evening before Yom Kippur, Henry has to go to the dermatologist to have a sebaceous cyst looked at. His dermatologist is Stephen Gold-

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wasser, cheerful, something of a *yente*, with thinning red hair, a large fleshy face, and skin soft as a baby's. Goldwasser is a big advocate of the drug Retin-A.

"I think we'll have to freeze it off," Goldwasser says. "Are you going to Kol Nidre tonight?"

"I have an engagement," Henry says. "But tomorrow perhaps I'll—my mother has tickets."

"That's what she told me," says Goldwasser. "She was here Monday. Let's go get some liquid nitrogen and freeze this baby." He ushers Henry into the little room where he works on cysts and warts. "Have a seat, make yourself comfortable. Turn this way. Did you read about the Israeli woman in the *Jewish Opinion*?"

"I don't get—"

"This will sting just a little bit. I love this. I tell all the kids dermatology is just like *Star Trek* with the nitrogen—"

"Ow!"

"—and the laser guns. This is going to shrink right up. The woman apparently lost her child here in Venice. He's run away. They've found him, but he won't come back. She has no money, no connections. The Federation actually made an appeal for her so she'd have somewhere to stay for the holidays, and she's staying with the Fleishmans. You know Leon?"

"N-not intimately," Henry says.

"I think he's giving her legal advice. Here, did I give you this pamphlet on sebaceous cysts? Here's what it looks like under your skin. You see? And there's the wax formation. It's truly bizarre. Apparently the kid went by himself to one of these clubs and never came back."

Of course Henry doesn't breathe a word to Goldwasser. He simply makes his next appointment and leaves.

He is hardly in the mood to go to Michael's party that night, and yet he has to. It is Michael's fortieth birthday. This is the engagement he mentioned to Goldwasser. Not at all a social engagement; all business for him. The Art Biz, as Jason calls it. Hours of talk with prospective clients, networking with buyers, lawyers, and possible sources. It is business that tires the legs and wearies the soul as one makes the rounds in a dark and rollicking room, drink in hand. And what of the art? Where is that elusive beauty to be found? The vision of life, the line that makes you look and look again. The form of suffering, the vessel of light. The art is nowhere to be seen. Like the little nightingale in Hans Christian Andersen, she has flown away.

He was determined when he left the academy to open his eyes to the world. And yet how vulgar that world is. Is it simply that he's hidden behind university walls for too long? Is he thin-skinned? In fact, his skin is delicate, Goldwasser has told him. He had felt better when he was hiding. He had felt more confident. When he came West he still had the capacity to be shocked by it all. The people, the cars, the sun shining without seasons, the pursuit of material things. When he was shocked, he sees now, he could still enjoy it. He could take a kind of indignant pleasure in it. And now? Now he is weary, knowing, and regretful.

When he arrives at the party, Michael embraces him amid a throng of people, and Henry almost puts his hands up to protect himself. His charming fair-haired employer, mentor he might have called him, now embracing him with his slender arms, enfolding him in his Mephistophelian wings. The party is at a private men's club, and is full of dealers. There is music; there is wine. Strips of teriyaki steak on little sticks. There are erotic ice sculptures, showy kisses, shouted conversations. The conversations are about cars. It is all horrible. Not merely commercial, not merely work, but a horror.

The party is loud, and gets louder. People communicate in pantomime. The music and liquor flow through the crowd. There is singing at the piano. Henry feels his head buzzing. Soon his headache will unfold, like a pale night-blooming flower. The pianist bangs louder and louder. He strikes up a fanfare, and then waiters wheel in a birthday cake, a float on wheels, gargantuan, mafioso in proportions, and out of that cake springs a boy, *the* boy, wearing a G-string.

The next morning on Yom Kippur, Henry oversleeps. His mother calls at eleven o'clock.

"I'll have to take a taxi," she says.

"All right," Henry tells her.

"Even if it's a hundred dollars."

"How could it be a hundred dollars?" he asks her, his voice muffled in the bed. "I don't think it will be more than forty."

"Forty dollars for a taxi! How can that be? I've never spent so much on a taxi in my life. I've never had to go to the temple in a taxi. I don't know the way."

"Mother, don't cry." He cannot bear the sound of her weeping on the phone.

"I don't understand why you won't go now,

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when before you said you would take me," she says.

"I will go, mother. I will," he promises. He struggles out of bed and showers, gulps down half a cup of coffee and two pieces of toast for breakfast.

"I think it must be finished," she tells him as they park their car in the temple lot.

"But look at all these c-c-cars," Henry says.

He stops in the men's room on the way in to catch his breath. He cannot believe he managed to drive to the temple without an accident. He can't see straight. He washes his face and dabs his eyes with a scratchy paper towel. Then slowly he walks back through the social hall with its mural depicting Solomon sitting in judgment of the two women, the great king dressed in what looks like Masonic robes, holding a saber over the head of the innocent babe. He walks past Chagall's twelve tribes of Israel reproduced as twelve hooked rugs hanging on the wall. His mother is sitting near the front, gesturing for him to take the seat next to her. All around her sit couples and families, squirming children, widows, all listening to the rabbi's sermon.

Henry looks at the rabbi standing there in his rainbow-colored *tallis*. The rabbi is young and slight, with a thin face, and rather limp, thin hair. His voice is reedy, high enough to pierce Henry's muffled ears. "Why is it?" the rabbi is asking, "that on Yom Kippur we Jews stand together and read off the list of sins together? Murder, adultery, burglary, slander—whether we did it or not as individuals, we beat our breasts as a community. This is our tradition. One of communal, rather than personal, guilt, and one of communal redemption. We make a confession as a group. We stand up and speak to God as a group. We hear the verdict as a group. I said at the beginning I was going to speak about connections. This is what I mean by connections. When we stand and recite our sins, when we ask for redemption, every one of us is connected to everybody else. Ultimately your sins are my sins, and my sins are yours. We are all in this together. We are all interconnected at the most intimate level there is."

Henry shudders in the chill air of the sanctuary. He feels almost feverish. He does not want to be sitting there in that congregation, does not want to be touched by and connected to that mass of people, or, in fact, to anyone. He wants to go home. Back to his bed. He wants to be absolutely alone except for his books.

"LET'S PAUSE for a moment," the rabbi says. "Let's pause and meditate on what it means to be connected to each other. What we mean to each other with all our faults. Let's think about what it is to say: you and I are all mixed up together, and it doesn't matter who has done what in this past year. We've all done it. As the great theologian John Donne wrote: it doesn't matter for whom the bell tolls. It tolls for me, for you, and for all of us. No human is an island who can survive by him- or herself. We are each clods of earth on the continent. We are attached. So let's take a moment for silent prayer. Take the hand of the person next to you if you will. Connect yourself."

The organist plays softly, wisps and tendrils of music, and Henry finds himself in the strong grasp of his mother on one side and the sticky grip of a little girl on the other. For several long moments his mother sits with her eyes closed. "Mother," he whispers. "Mother, are you asleep?"

"Sh," she hisses, jerking awake.

The organist plays on, and Henry feels himself perspiring. He needs to extricate his hands, but he cannot. Instead, he sits miserably, pinned to his seat, the events of recent days clouding his head. The sight again and again flashing through his mind of the boy blasting through Michael's birthday cake, his perfect, hairless little body. Must he, Henry, be connected to that? Is he, Michael's manager and right hand, meant to be part of—to be co-author of that?

And then Henry sees something else. Just in front of him he sees Amalya Ben-Ami, the mother, with her hennaed hair and enormous handbag, this woman supposedly distraught and penniless, sitting next to Fleishman and his wife, her hosts and benefactors according to Goldwasser. And she is sitting there with her hand in Fleishman's and ever so slightly, Henry is sure of it, massaging his knuckles with her thumb.

Henry's eyes open, he gasps into the silence around him. Can this be? That this woman who has lost her son is now using the opportunity to carry on with this middle-aged and married man? This attorney? And at this moment Henry feels an inner sob, pain and relief mixed together. His disgust floods and overwhelms even his inmost guilt. It seems to Henry in this moment that not he but the whole world has cracked open to reveal a garden of grotesqueries, a garden worthy of Hieronymus Bosch with the variety and surprise of its cunning little monsters. It

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seems to him, as in a horror film, that the synagogue, the art world, the whole city of Los Angeles, is infested. Insect-ridden just underneath the skin. He sits up in his chair, heart racing. He pulls his hands out of the communal hand-clasping and rubs them with his handkerchief.

"Henry, we'll have an accident," his mother tells him, as they speed home. He grits his teeth and keeps driving. "Henry, you're going too fast." She is clutching the shoulder strap of her seat belt. But he barely hears her. His mind is full of voices. "How is the art biz?" Jason asked him. "It's retail," his brother exploded when Henry told him Laura Ashley was not what he wanted. "Look, there are many paths in life," his therapist said, "and it's not like one road is necessarily better than the other. The question is, what's better for you, given that you are at this place right now."

And what is this place? Henry asks himself now as he speeds home, driving with cathartic anger, eating up the gray freeway, devouring the blazing sky. What is this place I have gotten into with the lithographs and the hooked-rug Chagalls? With Michael and his child lover, and the boy's own mother peddling herself in the temple. What is this place? What is it? He has uprooted his mother and brought her to live near him. He has learned to drive. And yet he can see it all now, can permit himself to see it with righteous certainty: this place, Venice, with its art and beach, and all its local color, is really Sodom. It is really Sodom and Gomorrah put together. Nothing but thievery and uncovered flesh.

He sees the dichotomy with great clarity. Venice on the one hand, brazen and rotting in the sun, and, on the other, the East Coast, all cloistered and covered, all petticoated modesty. Dear Princeton with its old trees and towers, all his dear universities, even NYU, bastions of books, art, learning, pockets of civility where the rituals and niceties of life are still observed. Where iron gates hold business, all that whoredom, at bay.

"Henry," his mother is telling him, "I thought the rabbi was very well-spoken."

He will have to go back. He will have to find a way. "Henry," his mother says, "Is that a police car? Is he chasing us?" Somehow he will support art. He will go back. He will rededicate himself to beauty. Not to the dealing, not the business, but to art itself. He will leave, leave, and he won't look back over his shoulder. He will leave, and he won't look back. He is already trying to remember the name of his brother's friend in Short Hills.

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MUSIC

(Over)praising Duke Ellington

Terry Teachout

"Writing shortly after Duke Ellington's death in 1974, the jazz scholar Gunther Schuller placed the composer of "It Don't Mean a Thing (If It Ain't Got That Swing)" in "the pantheon of musical greats—the Beethovens, the Monteverdis, the Schoenbergs, the prime movers, the inspired innovators." Though few other critics have gone so far, it is certainly true that Ellington is widely considered to be the most important composer, and one of the most important bandleaders, in the history of jazz. Many of his songs, including "Mood Indigo" (1930), "Sophisticated Lady" (1932), "Solitude" (1934), "In a Sentimental Mood" (1935), and "Prelude to a Kiss" (1938), remain popular to this day, and the more ambitious instrumental pieces he wrote for his orchestra starting in the late 20's won him lasting worldwide acclaim.

Paradoxically, the strength of Ellington's reputation rests in part on the fact that even his most enthusiastic admirers, including Gunther Schuller, have not praised his music indiscriminately. In particular, there has long been a consensus that Ellington's postwar output was far less successful than the music of his early and middle years. As Schuller explains in *The New Grove Dictionary of Jazz*:

> [I]t is generally agreed that [Ellington] attained the zenith of his creativity in the late 1930's and early 1940's, and that he worked best in the miniature forms dictated by the three-minute ten-inch [78 rpm] disc. Ellington's creativity declined substantially after the mid-1940's, many of the late-period extended compositions suffering from a diminished originality and hasty work, often occasioned by incessant touring.

But this measured appraisal has come under withering assault in recent years, especially in the race-conscious interpretation of jazz history formulated by the novelist and literary scholar Albert Murray, elaborated by the essayist Stanley Crouch, and popularized by the jazz trumpeter Wynton Marsalis.[1] According to Murray, for example, Ellington is not merely the most important jazz composer but "the most representative American composer." Indeed, Murray implies that Ellington was the greatest of *all* American composers, in or out of jazz:

> Not unlike Emerson, Melville, Whitman, Twain, Hemingway, and Faulkner in literature, [Ellington] quite obviously has converted more of the actual texture and vitality of American life into first-rate, universally appealing music than anybody else. . . . By comparison the sonorities, not to mention the devices of Charles Ives, Walter Piston, Virgil Thomson, Aaron Copland, Roger Sessions, John Cage, and Elliott Carter, for example, seem if not downright European, at least as European as American.

Although Murray has had little to say about Ellington's experiments in extended musical form, Crouch, for his part, asserts that Ellington was at his peak not in the "four-year streak of three-minute masterpieces he and his orchestra produced between 1939 and 1942," but rather

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[1] For a detailed discussion of the views of Murray, Crouch, and Marsalis, see my essay, "The Color of Jazz," COMMENTARY, September 1995.

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in the 1950's and 60's, when he was chiefly occupied with the multi-movement suites regarded by Schuller and most other critics as inferior in quality to his earlier work. But Murray and Crouch are united in the belief that Ellington was altogether a talent so great as to belong to a realm beyond criticism. In the recent "Black in America" issue of the *New Yorker*, Crouch called Ellington "the most protean of American geniuses":

> In his music he assayed a multitude of forms and voices as successfully as Herman Melville, satirized the skin off pomposity as gleefully as Mark Twain, matched Buster Keaton for surreal slapstick, equaled the declarative lyricism Ernest Hemingway brought to lonely moments of tragic resolution, rivaled William Faulkner in the dense intricacy of his tonal colors, conjured up a combination of Bill (Bojangles) Robinson and Fred Astaire in the way his percussive accents danced through suave billows of harmony, was a twin to John Ford in the deployment of his phenomenal repertory team of players, mixed satire and gloom with as much innovation as his good friend Orson Welles.

As can easily be deduced from such deep-purple passages, Murray and Crouch are not musicians. But their amateur appraisals have nonetheless been influential, to some extent because Ellington scholarship remains rudimentary. There is at present no scholarly biography of Ellington—the only fully serious book-length study by a musicologist, Mark Tucker's *Ellington: The Early Years* (1991), stops at the end of 1927—and surprisingly little criticism of his work has been produced by trained musicians.[2]

In the absence of a more thoughtful critique of Ellington's *oeuvre*, the Murray-Crouch line is fast acquiring the status of an orthodoxy. Yet it is false, or distorted, in nearly every particular. In order properly to understand and appreciate his achievements, it is necessary to distinguish the real Duke Ellington from the mythical figure who exists only in the heated prose of his uncritical advocates.

Born in Washington, D.C., in 1899, Edward Kennedy Ellington (he acquired the nickname "Duke" as a teenager) began to study piano at the age of seven. But he was not a prodigy, and his lessons lasted no more than a few months; thereafter, he never again studied music formally, and seems not to have taken any special interest in classical music until long after he had become famous.

The full extent of Ellington's talent became dramatically evident within a few years of his emergence as a bandleader. By 1930, he had composed and recorded numerous scores which, though technically not as sophisticated as those played by the big bands of Fletcher Henderson, Jean Goldkette, and Paul Whiteman, were easily comparable in originality to the music of the much-admired New Orleans pianist-composer Jelly Roll Morton. Such early efforts as "Black and Tan Fantasy" (1927) and "The Mooche" (1928) were exceptional in their combination of exotic orchestral colors and innovative harmonies, and quickly attracted the attention of other musicians.[3]

Ellington composed directly "on" his band, an unrivaled collection of musical eccentrics whom he chose for their idiosyncratic styles. He taught himself how to orchestrate by using the band as a laboratory, gradually mastering the art of blending individual timbres into a collective sound of unique richness and complexity. By the mid-30's, the Ellington band was consistently producing some of the finest music in jazz, and from 1940 to 1942 Ellington turned out a steady stream of compositions, among them "Ko-Ko," "Concerto for Cootie," "Harlem Air Shaft," and "Warm Valley" (all from 1940), which were justly hailed as masterpieces.[4]

But by this time, Ellington's fertile musical imagination had in certain ways outstripped his homemade technique. If his earliest orchestrations were worked out in collaboration with members of the band, as his scores grew more elaborate he began to make use of assistants who "extracted" instrumental parts from his rough sketches. This practice continued in varying degrees throughout Ellington's life (he used orchestrators, for example, in all the works he composed for symphony orchestra), as did his reliance on collaborators, both acknowledged and anonymous. Many of Ellington's early hits were based on themes supplied by his soloists: the clarinetist Barney Bigard had to sue him to receive credit (and royalties) for "Mood Indigo," and the trombonist Lawrence Brown, who claimed to have written part of "Sophisticated Lady," famously said to his employer, "I don't consider you a composer. You are a compiler."

From 1939 on, Ellington worked closely with Billy Strayhorn, the exact nature of whose contribution to the Ellington *oeuvre* may be the single most important unresolved issue in jazz scholarship. Initially billed as "staff arranger," Strayhorn—who, unlike Ellington, had extensive formal training in music—received full composing credit for several of the Ellington band's best-known recordings, among them

[2] Tucker has also edited *The Duke Ellington Reader* (Oxford University Press, 536 pp., $30.00), an exemplary collection of essays, articles, interviews, and documents on which I have drawn heavily in writing this piece.

[3] Most of Ellington's commercial recordings have been transferred to CD, often in multiple versions. The best single-source collection of early performances by the Ellington band is *The Original Edward "Duke" Ellington Hits* (King Jazz KJ 144/145 FS), a pair of CD's containing 44 original compositions by Ellington recorded between 1927 and 1938, including "Black and Tan Fantasy" and "The Mooche."

[4] The master takes of Ellington's 1940-42 recordings for Victor are available on *The Blanton-Webster Band* (RCA 5659-2-RB, 3 CD's).

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"Take the 'A' Train" and "Chelsea Bridge" (both 1941), and collaborated on many other works, a fact Ellington himself admitted far more readily than did many of his admirers. (In his *New Yorker* essay, Stanley Crouch gives Ellington sole credit for several compositions for which the two men actually shared equal billing.)

But Strayhorn, because he was homosexual, deliberately kept a low profile; little was written about him until after his death, and it was not until this year that the first biography, David Hadju's *Lush Life: A Biography of Billy Strayhorn*, was published.[5] In the course of his research, Hadju examined Strayhorn's private papers, on the basis of which he states unequivocally—though often without documentation—that in addition to their acknowledged collaborations, Strayhorn wrote parts of several of Ellington's most important works, including *The Tattooed Bride* (1948) and *A Tone Parallel to Harlem* (1950), both of which have been cited by Crouch in support of his claim that Ellington's later compositions are superior to his earlier ones.[6]

On the question of Ellington's professional relationship with Strayhorn, Hadju's book is of value mainly as a road map for future scholars. And even on the assumption that his claims prove true, it is important not to overstate their significance: there can be no doubt that Ellington was primarily responsible for the bulk of the music performed and recorded under his name. Still, the awkward fact remains that much of Ellington's work poses major problems of attribution.

PART OF what led Ellington to employ better-trained musical collaborators was his own lack of technical assurance—the same thing that led him, in general, to shun longer forms.

In 1935, Ellington told a reporter he would never write an opera or a symphony. "I have to make a living and so I have to have an audience," he explained. But at the same time, he was working on his second extended composition, a twelve-minute single-movement work called *Reminiscing in Tempo*, and eight years later, in 1943, he would unveil a 50-minute-long "tone parallel to the history of the American Negro" called *Black, Brown, and Beige*. It received its first performance at Carnegie Hall, the quintessential American symbol of musical legitimacy.

It is hardly surprising that Ellington should have sought to move beyond the narrow compass of the miniatures in which he specialized. Starting in the 30's, he was praised by classical musicians who found in his work a sense of compositional unity unprecedented in jazz. In 1934, the English composer-critic Constant Lambert called him "a real composer, the first jazz composer of distinction," while in 1938, Aaron Copland, writing in the magazine *Modern Music* about big bands and their leaders, observed:

> [T]he master of them all is still Duke Ellington. The others, by comparison, are hardly more than composer-arrangers. Ellington is a composer, by which I mean, he comes nearer to knowing how to make a piece hang together than the others.

Yet it was not until 1931 that Ellington first recorded an original composition, *Creole Rhapsody*, greater in length than a three-minute 78 side, and the experiment was not repeated until 1935 and *Reminiscing in Tempo*. Thereafter, Ellington attempted only rarely to compose in longer forms, most notably in *Diminuendo and Crescendo in Blue* (1937), *Black, Brown, and Beige*, *The Tattooed Bride*, and *A Tone Parallel to Harlem*. The vast majority of his "extended" works are actually suites whose purported structural unity is more a matter of clever titling (*The Perfume Suite*, *A Drum Is a Woman*) than anything else, and which are extremely uneven in musical quality.[7]

The reason Ellington avoided longer forms is clear from his occasional attempts at working in them: he had only a superficial grasp of the techniques necessary to create organically larger musical structures. While all his extended pieces contain passages of great beauty and originality, none—with the possible exceptions of *Reminiscing in Tempo* and *The Tattooed Bride*—can be said to "work" structurally.

The difficulty facing Ellington was not lack of talent, but lack of training. As Gunther Schuller explains:

> There are some talents involved in the art of composition which can be inborn, intuitive, or acquired subconsciously by absorption of a given musical environment. . . . But other compositional skills have to be learned, usually by some form of systematic study. From this requirement even the genius is not exempt, although obviously he does not need to acquire these in academic or formal settings. . . . Ellington's lack of technique and formal skills hindered him. He was content [in his longer works] to repeat thematic material, mostly with only the scantest of variations (or indeed none), too

[5] Farrar Straus & Giroux, 306 pp., $27.50.

[6] *The Tattooed Bride* is part of *Masterpieces by Ellington* (Sony COL 459407 2); *A Tone Parallel to Harlem* can be heard on *Ellington Uptown* (Columbia CK 40836). According to Hadju, Strayhorn composed the coda of *Harlem* and "helped fashion" the arrangements for the entire *Masterpieces* album.

[7] *Creole Rhapsody* and *Diminuendo and Crescendo in Blue* are both on *The Original Edward "Duke" Ellington Hits*, the former in two different versions. *Reminiscing in Tempo* is available as part of *Duke Ellington and His Orchestra, 1935-1936* (Classics 659). Excerpts from *Black, Brown, and Beige* recorded by the Ellington band in 1944 can be heard on *Black, Brown, and Beige: The 1944-1946 Band Recordings* (Bluebird 6641-2-RB, 3 CD's). The best of the later suites are *Such Sweet Thunder*, a 1957 Ellington-Strayhorn collaboration nominally based on the plays of Shakespeare (Sony COL 469140 2), and *The Far East Suite* (1966), whose most successful movement, "Isfahan," was composed by Strayhorn alone (Bluebird 07863-66551-2).

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> frequently relying on endless pedal points, on rambling piano interludes filled in by himself. . . . At best, themes and ideas simply succeeded each other; rarely did one have that sense of inevitability which marks great art.

Creole Rhapsody, Ellington's first sustained attempt at breaking the bounds of repeating-chorus song form, was in all likelihood inspired by the example of George Gershwin, and a comparison between the two men is illuminating. Like Ellington, Gershwin was a master miniaturist; and as with Ellington, Gershwin's *Rhapsody in Blue* (1924), his first attempt at large-scale composition, was structurally incoherent. But unlike Ellington, Gershwin realized early on that he would never master the larger forms on his own. Not only did he study composition, he also familiarized himself with a wide range of classical music, up to and including the works of such modernists as Arnold Schoenberg and Alban Berg.

This course of study made it possible for Gershwin to produce a series of "classical" compositions of increasing structural complexity, culminating in the 1935 opera, *Porgy and Bess*. None of these works is completely successful from a formal standpoint (though *An American in Paris* comes close), but it is nonetheless plain that Gershwin understood what he was trying to do, was intimately familiar with his models, and, had he lived, would almost certainly have solved the problems with which he was still grappling at the time of his death in 1937.

Ellington, by contrast, gave no indication of even recognizing that his limitations were limitations. At no time did he seek formal training, and to the end of his life his musical culture remained severely restricted. ("Instead of studying larger forms," the composer Alec Wilder once remarked, "Duke simply hired Billy Strayhorn.") His rare "symphonic" pieces appear to have been inspired by the mere desire to produce such works, not by any genuine comprehension of their structural imperatives. And in time he found an easier way to win the exalted reputation of a "classical" composer: the much-publicized suites of his later years allowed Ellington and his admirers to claim that he had done what in fact he had not done, and could not do.

It is not necessary to misrepresent Duke Ellington's gifts in order to assure him of a secure place in the history of American music. Whatever his shortcomings, he did create music of extraordinary individuality, and there seems little doubt that his best work—most of which is from the 1930's and 1940's—will last.

Why, then, do Albert Murray and Stanley Crouch make claims for Ellington that cannot be justified by an objective appraisal of his work? Partly, I think, out of simple musical ignorance. But it should also be noted that the Ellington of their writings may be to some extent the product of a racial myth, and as such not accessible to rational discussion. How else are we to explain, for example, Murray's insistence that Ellington was more authentically "American" than Ives or Copland, or his implication that this alleged authenticity somehow made Ellington a better composer? Or Crouch's insistence that Ellington was equally at home in short and long musical forms, and that he is worthy of comparison with such iconic figures of American literature as Herman Melville and Mark Twain? The oddly defensive belligerence of such extravagant comparisons tells us nothing useful about Ellington, but much about the degree to which even the most confident black intellectuals may be afflicted by self-doubt.

Such comparisons, however, also do a grave disservice to Ellington himself. If he was a great musician—as I believe he was—then his greatness will hardly be diminished by the searching scrutiny of qualified critics and scholars. By contrast, his reputation is clearly diminished by insupportable claims that he produced (in Crouch's words) "masterpieces, long or short, in every decade," or that his music is in any meaningful sense superior to that of such "European" composers as Ives or Copland.

Ellington himself would have been appalled by such claims. "To attempt to elevate the status of the jazz musician by forcing the level of his best work into comparisons with classical music," he wrote in 1944, "is to deny him his rightful share of originality." This statement is as true today as it was a half-century ago. There is nothing to be learned by directly comparing a three-minute blues like Ellington's "Ko-Ko" with a 45-minute symphony by Copland. The composer of the former was incapable of composing the latter (and vice versa), yet both were masters of American music, each in his own way. The inability of the Ellington mythmakers to accept this fact separates them from those who revere the achievements—while acknowledging the limitations—of the real Duke Ellington.

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Books in Review

On the Move

Migrations and Cultures: A World View
by Thomas Sowell
Basic Books. 516 pp. $30.00

Reviewed by
Christopher Caldwell

IT MAY soon become much harder to enter and stay in the United States than it is now. With a major congressional reform bill in the works, and with each of this year's presidential candidates vying to take a harder line than the other, the current seems to be turning against high levels of immigration.

Today's anti-immigration movement, though often misguided, should nevertheless be distinguished from raw xenophobia. Even foes of our present, latitudinarian policies have expressed their pride in America's basic identity as a "nation of immigrants," as well as their desire to benefit from the skills that at least some immigrants bring. The problem, as they see it, is that immigration appears to be functioning less well than it once did at filling the country with talented people and fresh ideas.

Thomas Sowell's *Migrations and Cultures* thus appears at a propitious moment. Sowell, a distinguished economist who is now a senior fellow at the Hoover Institution, is the author of dozens of books, several of which—including four in this decade alone—deal with race and culture, and the politics that arise from the intersection of the two. If one idea animates his work on the subject, it is that the conventional wisdom—namely, that aptitudes, inclinations, and opportunities are spread evenly among all ethnic and cultural groups—is nonsense. Culture matters, and it is remarkably persistent.

Sowell breaks his new book into six sections, each following a different ethnic group—Germans, Japanese, Italians, Chinese, Jews, and Indians—through every country to which they have migrated in significant numbers. His enterprise requires him to present mountains of data which he then picks through with patience, counting (optimistically) on equal patience on the part of his reader.

Although each of the six sections makes an independent whole, and while in each case Sowell advances conclusions in a gingerly manner, readers who troll his findings will discern certain constants, especially among immigrant groups that have succeeded.

First, with exceptions, it is character, rather than skills, that gives the best indication of how immigrants will perform. While German farmers in Brazil enjoyed no material or technological advantage over the descendants of Portuguese colonizers, they were several times more productive. The key to their success, Sowell argues, lay in a refusal to view manual labor as beneath their dignity.

Second, for a group to prosper over the long haul, education must be a priority. Italians, viewing higher education as a threat to family cohesion (it is), suffer in their long-term economic prospects. Though Sowell does not mention them, the same is true of Mexican immigrants to the U.S. For the Japanese in Peru, Germans in Brazil, and Jews in America, the choice to invest

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resources in the education of their children has always paid off.

Third, what does not pay off is politics. The Japanese in Hawaii, though very active politically, have lower per-capita incomes than the Japanese in the continental United States. Sowell speculates that this may be due to the fact that Hawaiian Japanese came from poorer regions and classes, but one cannot help noticing the similarity of his critique here to the one he advanced in *Ethnic America* (1981). There, he pointed to blacks and Irish as examples of overpoliticized groups which have lagged behind others in almost all regions of the U.S. By contrast, the most prosperous groups—the Chinese, Indians, Japanese, and Jews—have been largely apolitical.

Fourth, Sowell disputes the popular belief that the "clannishness" of certain successful groups is a leading source of ethnic prejudice against them. The Chinese in Indonesia have been highly intermarried and assimilated, but also viciously persecuted. By contrast, the most clannish among wealthy ethnic groups in the West are the Indians, but they have also faced the least hostility and prejudice.

Fifth, though there is something in culture so powerful and persistent that it appears permanent, this should not be confused with racial or ethnic makeup. The results of migrations by similar peoples are not always and everywhere the same. The Gujarati Indians who settled the east coast of Africa have vastly enhanced the wealth of the region and have tended to earn several times the income of the local African population. But the Indians from the Ganges basin who settled in Guyana and Trinidad have wound up with *lower* incomes than their fellow countrymen of African descent. Likewise, the Italians who arrived in droves in Argentina starting in the 1860's were considerably more successful there than in the United States. The reason, according to Sowell: a spendthrift ethic among the earlier settlers in Argentina, to which Italian parsimony, inculcated over centuries of capricious harvests, was a natural and salutary corrective. In the more frugal United States, this particular Italian virtue was at a lower premium.

Migrations and Cultures forcibly brings home the lesson that, although from the point of view of economic development there may be better and worse immigrant groups, it is misguided to talk of immigration itself in the abstract, as if it were always a good, or always a bad, thing. Different immigrations bring different peoples with different skills to countries differently able to absorb them. What is important in Sowell's view is not that immigration moves bodies, but that it moves ideas and cultures.

To pro-immigration forces, that in itself should be a source of concern, for modern technology means that ideas and cultures no longer need bodies to travel in. As Sowell writes, "International migrations have tended to become a less and less effective way of transferring human capital."

The logical conclusion—although Sowell does not state it baldly—is that over the coming years, as the opposition to immigration continues to rise, the utility of immigration will also be falling. The combination of these two factors means that the level of immigration—legal and perhaps even illegal—can be expected to wane. Although Sowell himself is never deterministic on the subject, he shows throughout that because immigration is rooted in human nature, it is subject to its own set of eternal verities. *Migrations and Cultures* is deeply instructive in acquainting us with some of them.

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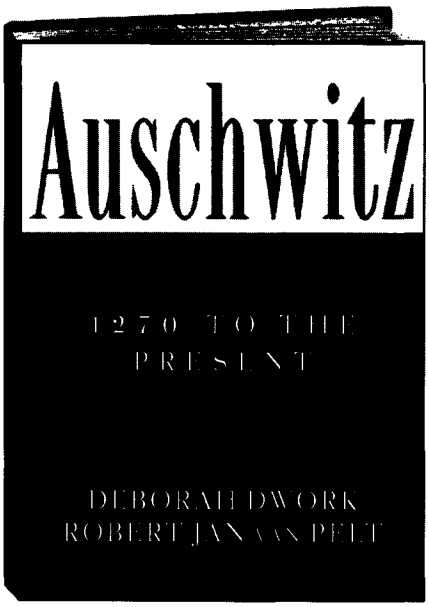

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In the Wolfhound Century

Tangled Loyalties: The Life and Times of Ilya Ehrenburg
by Joshua Rubenstein
Basic Books. 482 pp. $35.00

The Bones of Berdichev: The Life and Fate of Vasily Grossman
by John and Carrol Garrard
Free Press. 437 pp. $27.50

Reviewed by
Gary Saul Morson

"THIS WOLFHOUND century has hurled itself upon my shoulders, but I have no wolfish blood running in my veins." So wrote Osip Mandelstam, the Russian poet now regarded as perhaps the greatest of our century. Mandelstam was born a Jew and would die in the gulag, devoured by Stalin's wolves. Although his story was not atypical, not all his peers were quite so unlucky as he. Two writers who witnessed the horrors of the Stalinist period but managed to survive and even, in varying degrees, to prosper were Ilya Ehrenburg (1891-1967) and Vasily Grossman (1905-64). Each is now the subject of a new biography, and the two books together offer an occasion to reflect on the moral compromises different individuals make in the face of a brutal regime—and, as it happens, on the compromises biographers make to justify the lives they narrate.

BOTH GROSSMAN and Ehrenburg were born into assimilated and privileged Russian-Jewish families. Like only a few Jews at the time, they grew up speaking Russian rather than Yiddish, and their connection with Judaism was tenuous, enforced less by tradition than by anti-Semitism. Although their careers took very different paths, the two of them collaborated on an important project that never saw the light of day, *The Black Book*, which detailed Nazi atrocities against Jews on Soviet territory.

As a boy, Ehrenburg had befriended the future Bolshevik leader, Nikolai Bukharin, and with him was drawn into radical politics, leading eventually to exile in pre-World War I Paris. There he continued to participate in Bolshevik activities until he made the mistake of writing parodies of Lenin; Bolsheviks, he discovered, could not take a joke. Leaving the party, Ehrenburg turned to the life of a *littérateur*, associating with Apollinaire, Cocteau, Modigliani, and Chagall, and becoming notorious for his bad dress and his decadent poetry, some of which seemed to indicate he had become a Catholic.

Ehrenburg returned to Russia in 1917, shortly after the February revolution which overthrew the czar and brought in the provisional government. By November of that year, the Bolsheviks had seized control; now Ehrenburg became an ardent polemicist *against* them, comparing Russia to a woman raped. When the Bolsheviks won the ensuing civil war, Ehrenburg "reassessed" his anti-Communist journalism, a process which Joshua Rubenstein refers to as "a change of heart" but which sounds more like a desperate attempt to cut his losses. Bukharin saved him from arrest, and Ehrenburg managed to go abroad legally.

In the following years, Ehrenburg wrote some distinguished fiction—including his whimsical novel *Julio Jurenito*—and articles for émigré papers, until, at last, he "made his peace with the regime" (as Rubenstein puts it) and became foreign correspondent for *Izvestia*. His turnabout was complete. He penned fiercely partisan articles on the Spanish Civil War, recruited Western writers to support the Soviet Union, and became, in short, a hack. Although he knew about the gulag and the purges, he concealed what he knew from the people he recruited.

One of his Spanish friends at this time commented that it was disturbing to watch Ehrenburg "assassinate the artist in himself through his anguish, his fears, his concerns, and his profitable mission." Profitable, indeed: for much of his life, Ehrenburg managed to live comfortably abroad and to travel back and forth as often as he liked, when for other Russians mere contact with foreigners could earn a trip to the gulag.

EHRENBURG REACHED the height of his fame and influence during World War II, when he made it his mission, as Rubenstein writes, "to teach the Red Army how to hate." His articles—he penned over 2,000 of them before the war was over—were so popular and effective that a decree was issued forbidding soldiers to use them for cigarette paper. Today, what strikes one most about these articles is their bloodthirstiness:

> Now we understand the Germans are not human. Now the word "German" has become the most terrible curse. Let us not speak. Let us not be indignant. Let us kill. . . . If you have killed one German, kill another. There is nothing jollier for us than German corpses.

After the war, Ehrenburg made it his business to praise the newly installed Stalinist regimes in Eastern Europe, singling out Enver Hoxha of Albania, the most brutal dictator of them all, for his "faith in human nature and respect for the dignity of the individual." He maintained that citizens of Bucharest lived better than Parisians, wrote a lot of crude anti-American propaganda designed to appeal to West Europeans, and, in Washington, solemnly declared that "one who hates the Soviet Union" was by definition a fascist. He was particularly effective in orga-

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nizing Western intellectuals into "peace movements" while, as he knew, Stalin was rapidly building his armies, rushing to create nuclear weapons, and consolidating his hold on Eastern Europe.

Whenever he got into trouble—as, to be fair, he often did for his Western ways, for being Jewish, and for cautiously testing the limits on what could be said in and about art—Ehrenburg turned to Stalin for help. And time and again, Stalin responded. Once, when he was having trouble getting a section of a novel published, he wrote to the Great Leader, who telephoned him to say: "Just keep writing, you and I will try to push [it] through."

Ehrenburg's amazingly successful career has led many observers to accuse him of having been a secret agent for the Communist regime. Rubenstein denies it. But even if he was not an agent, how is his behavior to be justified?

Unfortunately, while conceding that Ehrenburg struck some morally troubling compromises, Rubenstein for the most part rushes to his defense. Thus we are told more than once that during the 1930's Ehrenburg was "compelled" to support Stalinism at home and abroad because fascist regimes were consolidating themselves around the world. But *at that time*, nothing the fascist regimes had yet done was remotely comparable to Stalin's murder of millions of peasants in the early 1930's. As for Ehrenburg's behavior after the war, Rubenstein asserts that he had no choice if he was to keep seeing his Swedish mistress, while in mitigation he reminds us that Ehrenburg did help to get the work of executed writers like Isaac Babel rehabilitated and, at moments of relative liberalism, took advantage of the opportunity to criticize official doctrines of art.

The "Ehrenburg question," then, the question of compromise, is a very "tangled" one indeed, and could be asked of many writers. In the Soviet Union, if a writer protested, he would accomplish nothing and would die needlessly; but if he compromised too much, he necessarily wound up doing some heinous things. The more "tangled" the question, the more sensitive the scholar or biographer must be to moral complexity. But Ehrenburg, for one, committed a number of unconscionable acts of collaboration, and it is a pity that his biographer seems bent on obscuring that inescapable fact.

Vasily Grossman presents a different case from Ehrenburg, as John and Carol Garrard make clear in *The Bones of Berdichev*.

The Garrards have written a book on the model of *Lord Jim*: the story of a man who spends much of his life atoning for disgraceful acts. The mistakes were rather common Soviet ones. Thus, Grossman failed to speak up for arrested relatives and friends when he could have helped them at minimal risk to himself; in one of his stories, he attacked the uncle who had raised him, which may have led directly to the old man's arrest; and most disturbing of all, when he could have saved his mother from the Nazis by the simple expedient of sending her a ticket to Moscow, he neglected to do so. The Garrards plausibly see Grossman's subsequent attempts to publicize the Holocaust, and later the various Stalinist mass murders, as acts of atonement for, in particular, letting his mother die a horrible death.

Unlike Ehrenburg, Grossman spent his early years quietly, study-

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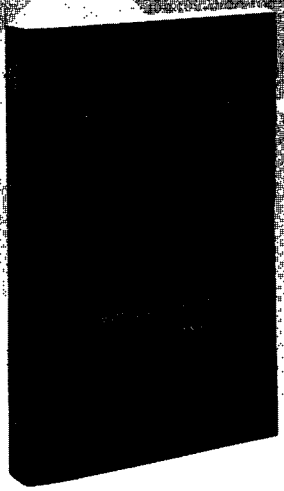

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ing to be a chemist. But he soon grew bored with this vocation and took advantage of a false diagnosis of tuberculosis in order to pursue a career as a writer. (Soviet law forbade switching jobs without official permission.) By the mid-1930's, he had won membership in the official Writers' Union, and was gaining a reputation as a journalist and literary figure.

GROSSMAN'S RISE coincided with Stalinist Russia's descent into state-engineered mass famine and terror. In the early 1930's came the collectivization of agriculture, more accurately described as a war on the countryside, in which over ten million peasants lost their lives, most of them as a result of a deliberate campaign of mass starvation. Grossman's posthumously published novel, *Forever Flowing*, includes a chapter in which a Bolshevik official reminisces about trains that were sealed so that no one could throw food to the starving beggars. Grossman had witnessed such beggars on a trip to Ukraine in those years, where he also learned that, as previously in the civil war, there were instances of cannibalism as well.

And this was only prelude. In 1937 came the Great Terror, in which some four million people lost their lives in random purges. The gulag swelled to tens of millions. No one was safe: of the 1,966 delegates at the Communist party "Congress of Victors" in 1934, 1,108 had been shot by 1939. It became common practice, when someone was arrested, to imprison his relatives as well. Denunciation of neighbors became the rule, not only to settle old scores or to free up scarce living space but because it was criminal *not* to.

Given all this, it is hardly surprising that when the Germans invaded Russia in 1941, they found willing collaborators among all those Ukrainian relatives of the starved peasants. Grossman's birthplace, Berdichev, a Ukrainian town that was about half Jewish, occupied a special place in the symbolic geography of the period, being known as the "Kike Capital." The Germans assigned a mere 25 SS men to kill the 30,000 Jewish natives of the town, Grossman's mother among them. The task would obviously have been impossible without the backing of the Ukrainian *Polizei*, or auxiliary police, who played a decisive role in the extermination of Jews all over Nazi-occupied Soviet territory.

WORLD WAR II brought Grossman to international renown. He spent the years as a war correspondent, living with the troops during the battle for Stalingrad and periodically crossing the Volga to file his moving reports. As the Russian armies recaptured lost territory, the fate suffered by the Jews in the western areas of the USSR became increasingly apparent. Grossman made it his project to let the world know what had happened.

He did so with semi-official approval. In the early days of the war, after suffering catastrophic defeats that brought the very survival of the Soviet Union into question, Stalin had permitted the formation of a Jewish Anti-Fascist Committee. This body mobilized sentiment in the West against the Germans and on behalf of the Jews, while also raising money and sympathy for the Soviet Union. Its literary commission, acting jointly with prominent Americans, undertook to document what had happened to Soviet Jews.

This was *The Black Book* on which Ehrenburg and Grossman collaborated. Grossman had already written articles on the topic, described by the Garrards as "the first treatments anywhere . . . of what later came to be known as the Holocaust." As for Ehrenburg, his job was to guide the volume into print; but in the end he bowed out and left the project in Grossman's hands.

As always, Ehrenburg was being sensitive to the political winds. By now it had become clear that the Soviets would win the war, and policy changed. The last thing Stalin wanted was to encourage the ethnic identity of a people with ties abroad, and he certainly did not want large numbers of Soviet citizens described as German collaborators. (Grossman's researches had shown him a great deal about his own regime, which was no less eager than the Nazis themselves to suppress evidence of atrocities against Jews.) To this day, *The Black Book* has never appeared in Russia.

AFTER THE WAR, when Stalin launched his campaign against "rootless cosmopolitans," especially Jews, things got worse: over a dozen prominent Jews associated with the Jewish Anti-Fascist committee were shot, and over a hundred others were arrested. Somehow, Grossman and Ehrenburg survived, though it is doubtful that either of them would have escaped had Stalin lived long enough to carry out his plan to deport millions of Jews to Siberia.

In his last years, Grossman wrote the two novels on which his fame now rests; neither could be published in Russia until glasnost. *Life and Fate* (completed in 1960, English translation 1980), is a huge panoramic treatment of World War II whose own fate was to be "arrested" by the party. (As a "liberal," Nikita Khrushchev arrested the manuscript rather than the author.) *Forever Flowing* (completed in 1964, English translation 1972), describes the return of a prisoner from the gulag, and makes explicit Grossman's idea that Soviet brutality could not be attributed only to Stalin and his "cult of personality" but rather formed the very basis of the regime.

In both books, Grossman advances the bold thesis that the Nazi and Soviet totalitarianisms were mirror images of each other, and morally equivalent. Both regimes killed people because of the circumstance of their birth, the one if they were Jews, the other if they came from peasant or bour-

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geois families. Marxism, in other words, was also a form of racism: racism by class.

The Garrards have done a commendable job in reconstructing Grossman's life, though they get carried away in their admiration for his abilities as a writer—his works survive as powerful documents, not as masterful literary works. Unfortunately, too, they tend to suggest rather facilely that the suffering inflicted upon the Jews has given them a morally privileged position, and to apologize for anything and everything Jews have ever done.

More unfortunately still, the Garrards advance the thesis that the unspeakable crimes of this century are to be laid at the door of science and technology. This pseudo-profundity—it is hard to see how either the terror famine or the pits filled with bodies at Berdichev required much technology—leads them into a little diatribe against nuclear weapons, violence on television, and environmental pollution ("poisoning the wells" is their unfortunate metaphor).

Indeed, they write, the problems of science and technology have now become "potentially apocaplyptic":

> We still live with the legacy of the hot and cold wars that have killed off and maimed countless millions of our fellow human beings but stopped us from tackling the root cause of death and destruction that have characterized our century.

If, in fact, we have learned anything in our century, it is that the search for "root causes" has been an open invitation to the most brutal "solutions" imaginable, and that invoking the apocalypse can justfy almost anything. Perhaps the best way to help avoid future horrors is to resist the rhetoric of extremes altogether.

Song of Myself

What Women Want
by Patricia Ireland
Dutton. 323 pp. $23.95

Reviewed by
Elizabeth Kristol

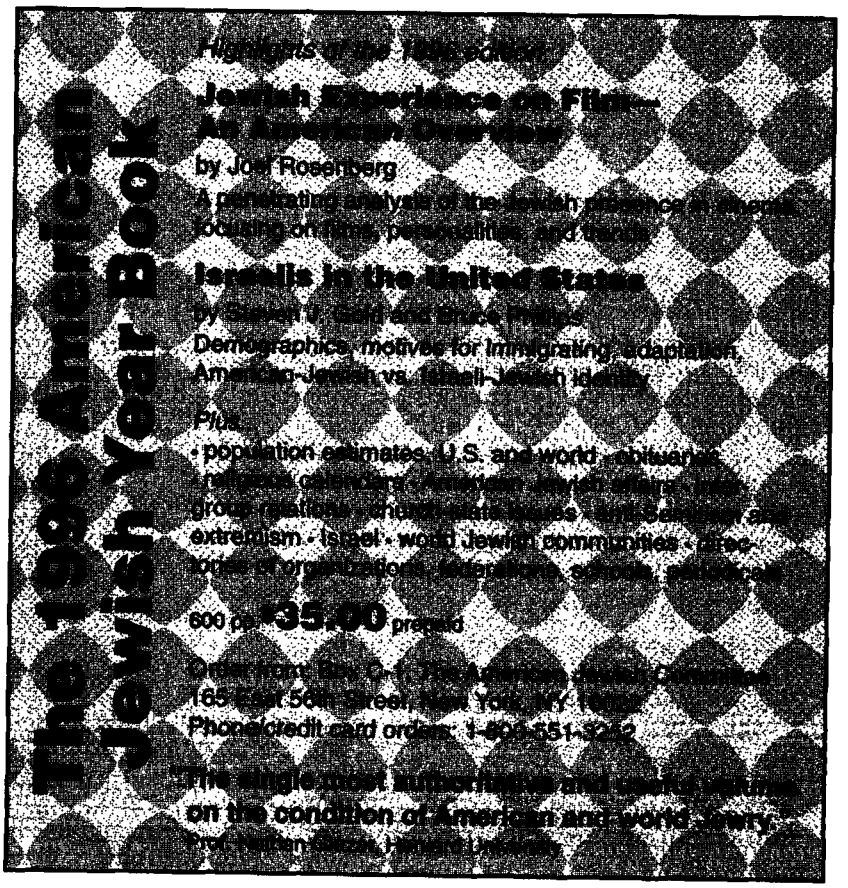
The notion that "I cannot love others until I love myself" is firmly ingrained in the popular psyche. Patricia Ireland, president of the National Organization for Women (NOW), has proposed a corollary: I cannot know what others want until I know what I want. That, she explains in her introduction, is why a book called *What Women Want* is all about herself.

And yet Ireland also says she had serious misgivings about writing an autobiography. "While I've committed my life to defending the whole spectrum of options for women," writes someone famous for juggling both a husband and a lesbian partner, "I feared that many would find themselves unable to identify with the choices I'd made." Moreover, she worried that her life "didn't necessarily seem worth emulating." As a young woman, she confesses,

> I was decidedly apolitical. I didn't begin my political career in college, or as an anti-war activist in the 60's. I didn't consciously become a feminist at all, for that matter, until I'd already spent some years in the workforce.

To be sure, Ireland has an excuse for being a late bloomer: like many other women, she spent years trapped in false consciousness. "The question of what I wanted was never asked," she says. "We were socialized always to put others and their

Elizabeth Kristol *writes frequently on feminism and other social issues.*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needs first." But her catalogue of the years spent putting the needs of others first includes some interesting highlights. As a teenager in Valparaiso, Indiana, she drank so heavily that her parents feared she would die in a car wreck. She was famous for her promiscuity. She married young, but soon got bored with her "quiet, stable" husband and abandoned him one morning "just after he came in off his tractor from the fields." She worked for a spell as a can-can dancer. She had an abortion. She did hallucinogens. She became a stewardess and partied in hotel rooms around the world.

THE LOST potential of her early years left Ireland tormented, and she is at pains to impress on us the world of difference between her state of being then and her state of being now. She directs our attention to a photograph of herself as a smiling young stewardess wearing a pillbox hat, and contrasts this with a later photo showing her as a middle-aged woman being led away in handcuffs from an abortion-rights demonstration in front of the White House. This second image, we are told, epitomizes the triumph of personal fulfillment and political consciousness.

To hear her tell it, Ireland's post-adolescent life was full of such occasions. As a stewardess, she once defied a pilot's orders. She wrote a letter to the airline complaining about that pillbox hat. Her crowning victory came when, on the advice of a member of NOW, she complained to the Labor Department about Pan Am's refusal to extend health coverage to her husband, and the airline was compelled to comply with anti-discrimination laws. Ireland exults:

> The liberation I felt at finally taking matters into my own hands, taking action, taking on the power establishment and winning can't be expressed in words.

She decided to become a lawyer.

Ireland's "moments of rebellion," as she calls them, persisted during law school, first at Florida State University, then at the University of Miami. When her law books informed her of the lowly status of married women, Ireland stopped wearing her wedding ring. After becoming a corporate lawyer in Miami, she got increasingly involved in the Dade County chapter of NOW, stumped for passage of the ERA, supported Miami's tiny Communist community in its clashes with Cuban émigrés, and picketed for abortion rights. Sometimes, she exclaims, people yelled nasty things at her; once she was splattered by eggs.

IRELAND'S MOST trying crucible came when she knew she was going to succeed Molly Yard as the president of NOW. Of course she realized she would be perfect for the job; but what would be the public reaction to her "unconventional choices" in life? After much agonizing, she released a statement: "I have a husband, and he is very important in my life. I also have a companion, and she is very important in my life, too." She would not offer any explanation for her "unconventional" decisions, and she does not here; this, she firmly tells us, is her first and final word on the subject.

And so Patricia Ireland, who espouses the cardinal principle of feminism that "the personal is the political," and who insists that "the choices we make daily . . . in our individual lives shape our whole society," places her own private life off-limits. She explains that just as it is an individual choice, and therefore a matter beyond discussion and judgment, to have a husband and lesbian companion at once, it is also an individual choice not to talk about it. Choice, after all, is what women want:

> Whether it is the choice to be out as a lesbian or bisexual, or to say "no comment"; to be single and celibate or to have multiple partners; to devise alternative families or to affirm our right to marry and have children in conventional nuclear family structures, I see the decision to make our own choices as empowering and necessary, even when we feel we might be making mistakes, wrong turns, or be heading into uncharted territory altogether. . . . The essence of feminism for me is the freedom to live our lives as we please, and to reinvent the world as we do so.

AT A moment when public figures across the political spectrum are waging a battle for the political center by praising traditional values, there is something almost charmingly out of sync in this exhortation to do your own thing, to "live our lives as we please." Hillary Rodham Clinton may be preaching the virtues of family and community in the raising of young children, yet the subject of children and motherhood does not appear once in *What Women Want*. Even feminists are starting to hem and haw about the moral questions surrounding abortion, but Ireland expresses no qualms at all about her own abortion, and reports that she gave herself a "standing ovation inside" when she announced it publicly. Marriage is so in vogue these days that even gay-rights activists are pressing for the right to exchange legally binding vows of lifelong monogamy; but the president of NOW breezily refers to her marital infidelity as if it were the most natural state in the world.

It may be, of course, that many of today's neotraditionalists are faking it, whereas Patricia Ireland is one true believer who refuses to mute or trim her views. If so, we should be grateful for her willingness to bare her soul (or at least part of it) and for reminding us just what the social and sexual agenda of the 1960's amounted to, and why organizations and ideologies like her own are in eclipse.

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Victory

Why the Allies Won
by Richard Overy
Norton. 396 pp. $29.95

Reviewed by
Bret Stephens

Why the Allies Won is a rarity among history books: difficult to simplify and a pleasure to read, it says many interesting things about a familiar topic without lapsing into banality or sophistry. To the question underlying the title of his book, Richard Overy, a professor of modern history at King's College, London, offers many answers, some broad, others specific, all solidly grounded yet none alone sufficient to explain the outcome of World War II.

Overy takes for a starting point the view that "much of what we believe about the war is illusion." By this, however, he does not mean to signal a revisionist account that will topple established verities. Rather, he is concerned that we have forgotten how narrow was our escape. Allied victory in the war is now commonly regarded as an inevitability, the only conceivable outcome for a cause whose superior moral claim was backed by equally superior might. Few today recall the alternative paths available to the Allies, which, had they been followed, might have led to a negotiated settlement, to a military stalemate, or to surrender.

As Overy shows, the facts did not augur well throughout the first years of the war. In 1941 alone, 1,300 British merchant ships were sunk, a number which the combined dockyards of the Allies could not possibly replace. In the East, Germany pulverized the Soviet Union's four-million-man army in a matter of months, and by October, as Soviet documents now show, Stalin was contemplating capitulation. In Asia, Japan seized the oil fields of Borneo with ease, clobbered the British at Singapore, and was poised to sweep American forces out of the Pacific.

Contrary to what is now generally believed, this grim picture was not much improved by the entry of the United States into the war. However vast American resources, they could not be put to effective use so long as the sea lanes of the Atlantic remained vulnerable to German submarines. Nor would they have counted for very much if Hitler had defeated Russia and consolidated his grip on Europe and the Middle East. And even when it became clear the Russian line would hold, America's productive capacity still did not give the Allies an overpowering advantage.

The extraordinary story of America's domestic war effort—necessary for victory but not sufficient—is ably retold here. By 1943, Germany was being outproduced by the Allies by a ratio of three to one in tanks and aircraft, and six to one in artillery pieces. Indeed, many historians see in these figures the explanation for Allied victory. Yet this, according to Overy, is a fallacy. All of the war's decisive engagements—Midway, the battle of the Atlantic, Stalingrad—were fought and won well before the balance of resources swung massively to the Allied side.

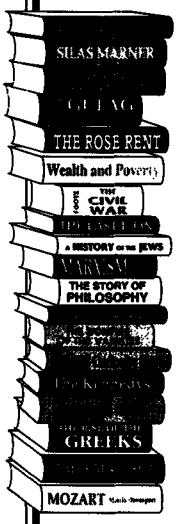
Similarly enlightening is Overy's analysis of the condition of Japan's military industries, which were far more backward than is commonly supposed. But what is really interesting is the contrast he draws between the economic performance of Germany and the USSR, the war's two competing totalitarianisms.

Here was a field of contest where the Nazis might have been expected to prevail. Hitler had spent much of the 1930's methodically preparing an already advanced economy for war. His invasion of the USSR in June 1941 deprived the Soviets of everything from air and mechanized forces to aluminum, manganese, and grain. Yet against every expectation, the Russians were able to recover. How they did so must be counted among the most remarkable achievements, and certainly the greatest puzzle, of the war.

One paradoxical explanation suggested by Overy traces the Soviets' turnaround directly to the magnitude of their initial losses. Extreme scarcity dictated the efficient use of resources, and central planning, however ill-suited to peacetime, proved well-suited for war. Soviet success was especially manifest in the development of new weaponry, where a premium was placed on simplicity of design, standardization of parts, and ease of maintenance, all of which proved crucial.

Standing above everything else, however, was the Herculean effort of the Soviet workforce. Hatred of the German invader; Stalin's success in casting the war in a nationalist vein; and the way factories were made the sole dispensers of every human necessity, from food to com-

Bret Stephens *is a young writer living in New York.*



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panionship, are all adduced by Overy as motivating factors. The rest of the job seems to have been done by raw coercion:

> Large sections of the workforce were placed under military law.... Absenteeism and lateness were treated like desertion. Repeated offenses meant the labor camp, though the conditions of everyday life were so drear for most workers that life in the camps and outside them became increasingly difficult to distinguish.

Thus were the "achievements of socialism" wrought, and thus, too, in no small measure, was World War II won.

IN NEAR-TOTAL contrast to the Soviet Union, Germany's industrial strategy fell victim to a complacency born of early success. Though the Nazis well understood the connection between economic and military might, they displayed an ideological antipathy toward mass production, preferring instead the solid German virtues of individualized craftsmanship and technical sophistication. Initially this conferred an edge, but as time wore on, problems began to show. Under pressure from above, German arms manufacturers came out with an incredible array of models with few interchangeable parts, nightmares to maintain in the field. Later, after the initiative passed to the Allied side, Hitler pursued costly technologies that promised last-minute salvation, at the expense of replenishing stocks of weapons that had already proved their worth.

All the while, the German system was burdened by inefficiencies of every kind: poor coordination between industry and the military; an intrusive, arthritic, top-heavy bureaucracy; an inability fully to exploit available resources. The German economy, writes Overy,

> fell between two stools. It was not enough of a command economy to do what the Soviet system could do; yet it was not capitalist enough to rely, as America did, on the recruitment of private enterprise.

STILL, THE crucial factor in the Allied victory, in Overy's view, was not the economic or military balance sheet on either side, but always and everywhere the human element, both in the ranks and at the top.

Soldiers, Overy writes, "do not fight to prove the statistics right, but from an effort of will." The supreme Allied commander, Dwight D. Eisenhower, put the same thought in different words. Hearing his civilian counterparts expatiate on a prospective "economic defeat" of the Axis, he complained that "not one man in twenty in the government realizes what a grisly, dirty, tough business we are in." In writing about that business, Overy never loses sight of the courage, ingenuity, and resolve that contributed to Allied victory, or of the fatuity and arrogance that led to Axis defeat.

Paradoxically, though, perhaps the book's weakest section is the one on political and military leadership. Although Overy recognizes the overwhelming impact of personality on the outcome of the war, his emphasis often seems strangely placed. Thus, he lavishes praise on U.S. Army chief-of-staff George Marshall but omits mention of his opposition to the Lend-Lease arrangements with Britain, no small misjudgment in a man of Marshall's influence. By contrast, in a capsule biography of Churchill, Overy gives a curt nod to the British leader's role in rallying England for the war effort, then derides his pretensions and shortcomings as a strategist. Though the evidence is partially persuasive, the point is picayune. Churchill's advocacy of an invasion of Germany via Italy and the Balkans would almost certainly have been a failure—but it was Churchill's decisions, not his enthusiasms, that ultimately mattered, and on the things that mattered most he consistently chose right.

But these flaws are in the end of small moment. Against the simplistic and nostalgic notion that the outcome of World War II was all but predetermined in the Allies' favor, Overy's analytical history offers a potent reminder of the perilous uncertainty that accompanied them at every step, and of the intelligence and brute will that made victory possible. Statesmen looking to the past for easy maxims will not find them in this book.

Conspiracy

Up From Conservatism: Why the Right Is Wrong for America

by Michael Lind

Free Press. 295 pp. $23.00

Reviewed by
Joshua Muravchik

IN SPORTS, Michael Lind might be called a phenom. After a relatively obscure stint as a rookie in the ranks of American conservatism—as a protégé of William F. Buckley, Jr., a staffer at the Heritage Foundation, and executive editor of the *National Interest*—Lind, a Texan now in his mid-thirties, was inducted into the major leagues after he published an essay in *Dissent* savaging all those with and for whom he had worked until that point.

Washing conservatism's dirty linen in the pages of a socialist magazine was a clever move. Despite *Dissent*'s modest circulation, Lind's public apostasy attracted word-of-mouth attention and won him a wide readership in photocopy. It also appeared to unleash a torrent within the apostate himself. Last year, Lind published *The Next American*

JOSHUA MURAVCHIK, *a resident scholar at the American Enterprise Institute, is the author, most recently, of* The Imperative of American Leadership: A Challenge to Neo-Isolationsism.

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Nation,* a political manifesto in which he laid out his own fresh-baked credo as a neonationalist, neopopulist, neoliberal. Now we have *Up From Conservatism*, which is essentially an expansion of his *Dissent* essay. There is also a Lind novel, *Power Town*, purporting to expose the real workings of Washington, and due out next year is a book-length epic poem. In the same brief span Lind has held senior editorial posts first at *Harper's*, then at the *New Republic*, and now at the *New Yorker*, to each of which he has contributed lengthy pontifications on a multitude of topics.

Amid all this busy-ness, Lind understandably seems sometimes to forget today what he said yesterday. Thus, in April 1995 he proposed, on the op-ed page of the *New York Times*, a whole new foreign policy for the United States: "Asia First." The time had come to "replace NATO," he instructed us; "for the next century, we must concentrate on Asia." Nine months later, back on the same page (this time with co-author Jacob Heilbrunn), and without so much as a how-do-you-do, Lind put forth a different global plan; now that we were on the verge of "The Third American Empire," he summoned his countrymen to rise to "the challenge of consolidating a new European-Middle Eastern sphere of influence while drawing back from Asia." Consistency, apparently, be damned: if the *Times* has the space, Lind will have the strategy.

Up From Conservatism boasts its own quotient of inconsistency, not to mention blowhard foolishness, but its main defining note is one of burning anger. Many interesting books have been written about political odysseys, but in Lind's case, as he tells it, there was no journey: he merely stood still at his lonely outpost of principle while the American conservative movement collapsed around him, or rather became transmogrified into a monster. As a consequence of that collapse, he warns, "the United States, on the verge of the 21st century, [is] in the control of a Washington cabal of reactionary white politicians from the South and West and their corporate sponsors."

In his recounting of the story, Lind's own moment of epiphany came in the early 1990's, when he discovered and then undertook to expose the kooky conspiracy theories in Pat Robertson's book, *The New World Order*, which recycles various archaic anti-Semitic fantasies (but with the explicit references to Jews removed). Other conservatives, however, even after having been apprised of the facts about Robertson, failed to react with the requisite degree of horror and revulsion. Lind names, among others, Norman Podhoretz, who, while acknowledging that pages in Robertson's book bore an unmistakable anti-Semitic pedigree, nevertheless declined, on the grounds of Robertson's longstanding support of Israel and other Jewish causes, to condemn him utterly.†

In the face of this *trahison des clercs*, Lind says he had no choice but to conclude that the conservatism he valued and once espoused had been swallowed up by the dark forces of the ultra-Right. He formulates what he learned from this whole episode in a characteristically sweeping *pronunciamento*:

> The only movement on the Right in the United States today that has any significant political influence is the far Right [which] has both public, political wings . . . and its covert, paramilitary, terrorist factions.

But wait: if that is really true, if "the paramilitary Right [has] changed from a fringe group into one of the major constituencies of the Republican party," how are we to explain the fact that nobody but Lind seems to have noticed, and that the American public has not risen up as one to repudiate the Republican party? The answer, Lind divulges in *Up From Conservatism*, is that the "cabal" operates by stealth, and specifically by procuring intellectual cover from neoconservatives, who "undertake to provide scholarly sounding rationalizations" for its emerging political "line." And what motivates these intellectuals to betray their calling? Greed and fear alike: any "who publicly dissent from the party line on important issues will have their foundation funds cut off."

"PARTY LINE," a term out of rather a different political tradition from the American one, is not used by Lind loosely. In what appears to be Kremlin fashion, that line actually gets laid down, he writes,

> at periodic "conservative summits," private meetings once a year or so between conservative editors like [Irving] Kristol, Podhoretz, and Buckley, occasional journalists like Charles Krauthammer, Republican politicians, and foundation executives.

Lind himself realizes this may seem a little hard to swallow. "It is," he elucidates helpfully,

> as though George McGovern, Dan Rather, and Jesse Jackson met periodically to decide what the party line of "liberalism" would be, and then issued marching orders to their subalterns in the Democratic party and the media.

But Lind hastens to assure us that it is so—and that there is even worse. For within the central committee of the plenum of the cabal there is an innermost command post, "possibly more influential," here revealed for the very first time: "the annual meeting of the Council on National Policy (CNP)," which draws together Republican congressional leaders with "far-Right radicals like Larry Pratt, the leader of Gun Owners of America." So "secretive" is *this* organization that

* Reviewed by George Weigel in the July 1995 COMMENTARY.

† See Podhoretz's "In the Matter of Pat Robertson" in the August 1995 COMMENTARY, and his exchange with Lind and others in the January 1996 issue.

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Lind himself cannot be sure where it ranks in the hierarchy of the cabal.

As for the ultimate beneficiaries of all these machinations, they are—surprise—"the corporate elite and the hereditary rich," two familiar bogeymen of old-fashioned populists to whose ranks Lind has added a third category, the "overclass." This last is made up of people holding advanced degrees from good universities (and their dependents), whose economic interests overlap with those of the corporate elite. Driven entirely by their narrow economic agenda, members of the overclass have so far forgotten the larger national interest that they are prepared to wage "class war . . . against the American middle-class majority." All this might be called the conspiracy within the conspiracy within the conspiracy.

I REMARKED EARLIER that *Up From Conservatism* is not without its gaping inconsistencies—and that is both an intellectual pity and a fatal flaw in a work pretending to explain, once and for all, how everything fits together in American political life. How, to take one bothersome detail, are we to reconcile the statement that "the conservatism of Buckley, Kristol, and Podhoretz [is] an ephemeral offshoot" with the revelation that this same trio of editors takes the lead in laying down today's conservative party line? Or again, if American conservatism decayed only recently, as Lind asserts, how can he also assert that "the main line of descent on the American Right" runs all the way back to "Father Coughlin through Joe McCarthy and George Wallace"? And if there is indeed such an unbroken line going back so many generations, how could he have spent a decade laboring in those tawdry vineyards without knowing it? One hopes that in the inevitable sequels to *Up From Conservatism*, such troublesome mysteries will be explained.

In the same spirit of impartial curiosity, I wish that Lind would enlighten us about his own secret affinity with none other than Pat Robertson. In *The New World Order*, Robertson, Lind observes in his tone of high dudgeon, is obsessed with "the nefarious schemes of international high finance." But whose obsession, pray, is this one?

> The [neoconservative] foundations, the little magazines, the little institutes and think tanks—all represent the application, in U.S. domestic politics, on behalf of big business and international finance, of techniques earlier used by the CIA to influence opinion abroad.

Over the years, the *New Yorker*, where Lind now makes his camp, has indulged in its share of chuckles at the expense of Texans and other yahoos, and lately it has also taken to warning us against the crackpot conspiracy theorists who lurk in the nation's fever swamps. In Lind, both Texas and the swamps are exacting their highbrow revenge.

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http://home.netscape.com. He's always had a lot of crazy ideas. As a Stanford professor, he mused about making 3-D graphics come alive on desktop computers. But no one listened. So he started *Silicon Graphics* and built it into a multibillion dollar legend. Then he began talking about taming cyberspace. But no one listened. So he handpicked a team of the best hacker talent in the telecosm. And soon after, *Netscape* soared to the highest IPO in market history. Now they listen. **Jim Clark bought his first copy of Forbes as a computer consultant in 1970.**

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